SEP 10 1943

The OIL AND GAS JOURNAL

Since 1896

MALONEY

has Served the OIL INDUSTRY
with Better Storage Vessels

Oil & Gas Separators
Pressure Vessels

Bolted Steel Tanks
Welded Steel Tanks

THE ORIGINAL BOLTED STEEL TANK MANUFACTURER

MALONEY TANK MFG. CO., TULSA, OKLA.

PRICE 20 CENTS SEPTEMBER 9, 1943

POTENTIAL CORROSION ELIMINATED

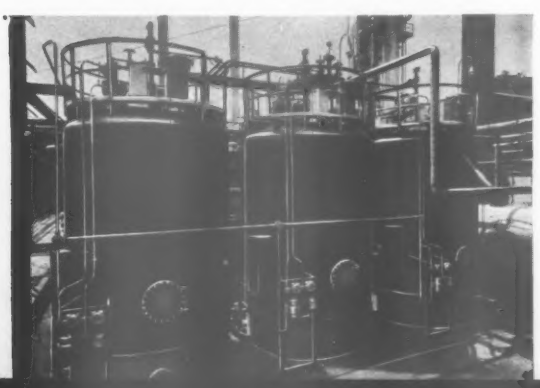
The photograph above shows effluent water from Petreco Desalters pouring into a refinery sewer. Carried away in this water are many harmful salts and impurities which, if not extracted, are the source of serious operating troubles.

Virtually every refiner will concede that salts in the crude charge cause operating difficulties. From salts are evolved the highly corrosive HCl, the cause of metal losses in furnaces, exchangers, lines and towers. Salts cause exchangers and tower-trays to become plugged. Certain salts build a scale on the inside of lines, condenser and exchanger tubes. Coke formed from salty oils is extremely hard, and often is deposited very rapidly. Such *effects* can, to a limited degree, be combatted with chemical neutralization, metallurgical improvements and frequent cleanouts. However, such measures *do not eliminate the cause. Petreco Desalting does.*

Petreco Desalters are consistently extracting 90 to 98% of the salt in the crude charged. In many refineries this has materially reduced corrosion, eliminated salt plugging, and decreased coke formation. On-stream time has been increased as much as 1000% in some cases. Petreco Engineers are familiar with the results Petreco Desalting is getting in refineries everywhere... Why not discuss your salt problem with one, *now?*

PETROLEUM RECTIFYING COMPANY
P.O BOX 2546, HOUSTON 1, TEXAS
648 EDISON BUILDING, TOLEDO 4, OHIO
530 WEST SIXTH STREET, LOS ANGELES 14, CALIF.

Representatives in all principal fields and refining centers



DESALTING • DEHYDRATING
Complete Refinery and Oil Field Service

The OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

Copyright 1943, by The Petroleum Publishing Co.

Vol. 42, No. 18 September 9, 1943

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *News Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refinery Editor*

W. L. NELSON, *Technical Editor* — W. V. HOWARD, Ph.D., *Field Editor*

HARRY F. SIMONS, *Production Engineering Editor*

Associate Editors

LYNN M. NICHOLS — PAUL REED

NEIL WILLIAMS

District Editors

JAMES McINTYRE, Tulsa 1, *211 S. Cheyenne Ave.* — CARL HOOT, Tulsa 1, *211 S. Cheyenne Ave.*

THOMAS F. SMILEY, Houston 2, *Sterling Bldg.* — E. H. SHORT, JR., Houston 2, *Sterling Bldg.*

L. P. STOCKMAN, Los Angeles 14, *Union Oil Bldg.* — HARRY F. SIMONS, Fort Worth 2, *Petroleum Bldg.*

HENRY D. RALPH, Washington 4, *Natl. Press Bldg.* — TOLBERT R. INGRAM, Denver 2, *State Office Bldg.*

O. C. PRESSPRICH, Saginaw, *News Bldg.* — J. P. O'DONNELL, New York 17, *415 Lexington Ave.*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — A. C. MacINTYRE, Oil City, *Derrick Bldg.*

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, *Eastern Manager*, New York 17, *415 Lexington Ave.* — HOWARD MARKT, *Cleveland Manager*, Cleveland 14, *Leader Bldg.*

C. R. FARMER, *Chicago Manager*, Chicago 2, *105 W. Madison* — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, *1400 S. Grand Ave.*

WAYNE RIVES, *Gulf Coast Manager*, Houston 2, *Sterling Bldg.* — A. J. CHAMBERS, Twickenham (Middlesex) England, *72 Cole Park Road*

MITCHELL TUCKER, *Manager, Research Dept.*, Tulsa 1, *211 S. Cheyenne Ave.* — JOHN D. REILLY, *Production Manager*, Tulsa 1, *211 S. Cheyenne Ave.*

Member
Audit Bureau of Circulations
Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Suppressed Military Data Prevent Motor-Fuel Analysis ... 28
Summary of Forecast for September 1943 ... 28
Magnolia's West Texas Pipe Line Virtually Assured ... 29
Sixty-Well Program for Arkansas Field Approved ... 30
Dewey Made Assistant PAW Labor Counselor ... 30
Compact Commission Will Study Gasoline Rationing ... 32
Letters: OPA Disclaims Responsibility for Labor Group ... 32
Associated's Aviation-Fuel Plant Nearing Completion ... 33
PIWC Told of Steep Rise in Oil Demand ... 34
Military-Gasoline Requirements 150 Per Cent Above 1942 ... 36
Production at M.E.R. in Most Districts ... 36
Problems of Condensate Production Studied on Gulf Coast ... 40
Higher Toolpusher Pay Proposed ... 45

Trends ... 27
This Week ... 31
Editorial ... 35
Federal Order Digest ... 39
Deaths ... 45
Natural-Gas News ... 77
Refining News ... 78
Pipe-Line News ... 80

ENGINEERING-OPERATING

Coring With Reverse Circulation ... 47
Pour-Point Stability of Lubricating Oils ... 54
Oil-Well Pumping Practices—No. 11 ... 60
Cracking Technology—No. 2 ... 66
Questions on Technology ... 70

Plant Practices ... 52
Book Review ... 59
Operating Ideas ... 65
Journalog ... 71
Cost Engineering ... 73
Eng. Fundamentals ... 75

EXPLORATION AND DRILLING

Week's Highlights ... 83
Completions in All Fields ... 83
Daily Average Production for Week ... 84
Completions by Areas Start on Page ... 84

ADDITIONAL FEATURES

Crude-Oil Prices ... 94
Drilling Contractors ... 100
Personals ... 102
Market Developments ... 104
Refinery Prices ... 105
Equipment Progress ... 107
Classified Advertising ... 109
Calendar of Events ... 112
Journalisms ... 112
Advertisers' Index ... 112

General Heading: BAKER CEMENT WASH-DOWN WHIRLER EQUIPMENT

Unit No. A-18

Subject: The Effect of Whirler Action in Washing Formation, Removing Bridges and Cementing

BAKER OIL TOOLS, INC.

Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Texas
Export Sales Office:
19 Rector Street, New York, N. Y.

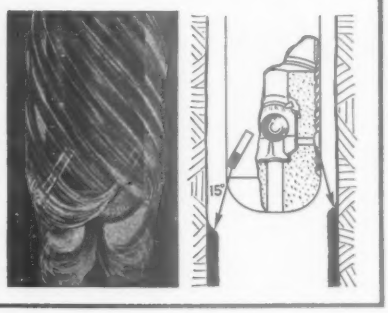
Index: 250.1
Date: September 9, 1943
Page: 1

Field results have indicated that the whirler action afforded by Baker Cement Wash-Down Whirler Equipment is both effective and advantageous in washing formation, removing bridges and particularly in securing a better cementing job.

The whirling motion imparted to the fluid as it leaves the Shoe, is the basic reason for the unit's remarkable effectiveness. Another contributing factor is the slight angle from the vertical at which the fluid leaves the ports (there is no direct jetting action against the side walls of the hole).

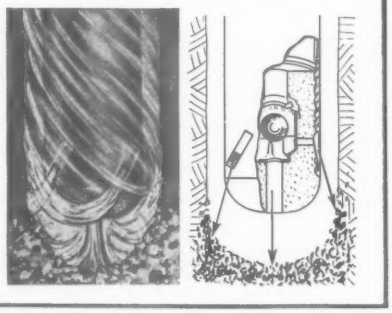
The results operators are securing in landing and cementing casing with Baker Cement Wash-Down Whirler Equipment bears out the soundness of the engineering principles incorporated in these units. The illustrative sketches below (not drawn to scale) show these principles in operation.

WASHING FORMATION



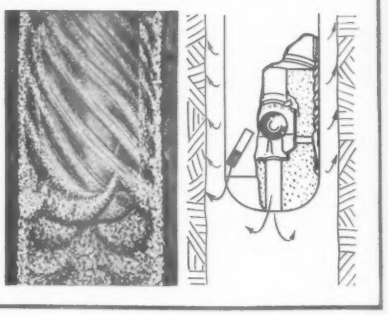
Note that the fluid is discharged through the baffled whirler ports at a slight angle from vertical (approximately 15°), effectively washing and removing at least a portion of the mud cake. There is no direct lateral jetting action against the side walls of the hole.

REMOVING BRIDGES



The angle of discharge through the baffled whirler ports of the Shoe directs the fluid against the *sides of the bridge*. The fluid which is discharged through the bottom of the Shoe also simultaneously attacks the center of bridge.

CEMENTING RESULTS

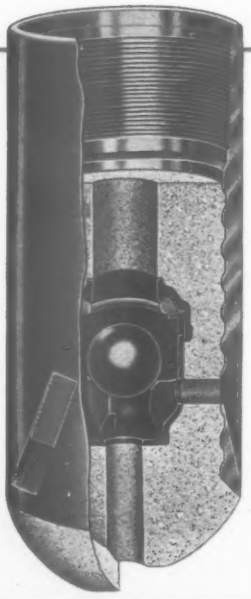


Uniform cement distribution is provided by effective whirling action imparted to fluid as it leaves the Shoe. Scouring action of the fluid preceding the cement, as well as scouring action of the first slurry as it strikes the formation, cleans the walls and affords best possible bond between the cement and formation at critical point—the Shoe and the Shoe joint.

THE BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE

Affords These Advantages:

- It will safely guide and float the longest and heaviest string of casing.
- It has a positive-acting BALL-TYPE Back-Pressure Valve.
- It provides WHIRLING ACTION which assures best possible cement distribution at the shoe joint with minimum hazard of channeling.
- It affords easy drillability.



GET THE FACTS

If you are not fully acquainted with Baker Wash-Down Whirler Equipment and the remarkable results operators are securing with it . . . get the facts today.

For more information, see pages 227-237 of the 1942 Baker (or Composite) Catalog, or contact nearest Baker office or field representative.

Service Note
Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 84

CRUDE PETROLEUM 4,244,870 bbl. daily average—up 42,750 bbl. One year ago 3,963,630 bbl.

CRUDE STOCKS 236,170,000 bbl. as of Aug. 28—down 316,000 bbl. One year ago 248,364,000 bbl.

GASOLINE STOCKS 72,525,000 bbl. as of Aug. 28—down 290,000 bbl. One year ago 79,713,000 bbl.

RESIDUAL FUEL-OIL STOCK 67,250,000 bbl. as of Aug. 28—up 526,000. One year ago 78,270,000 bbl.

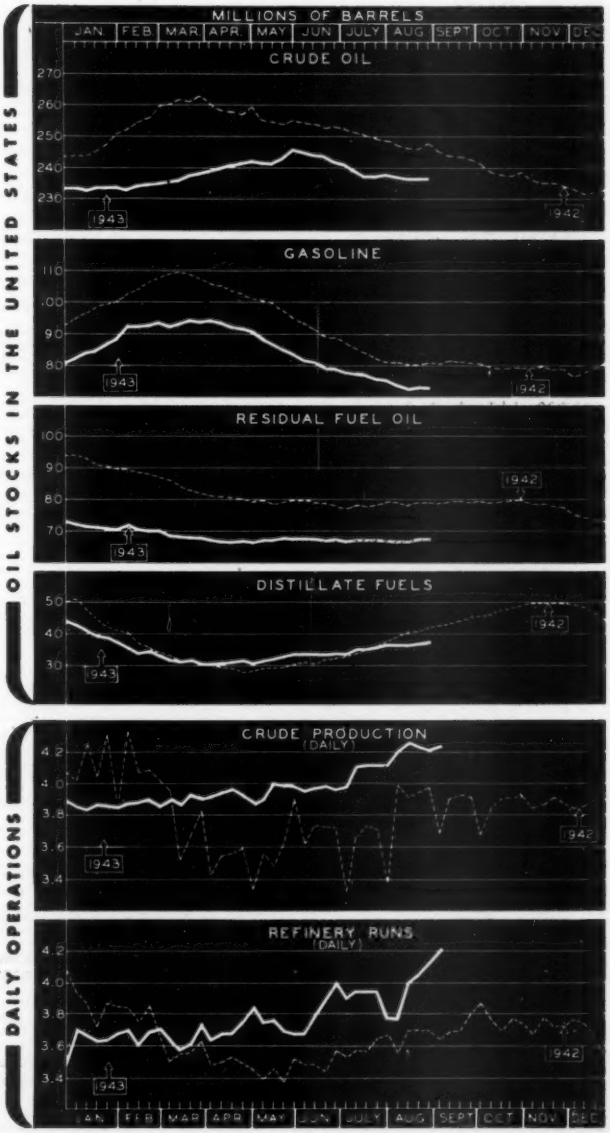
GAS OIL AND DISTILLATES 37,928,000 bbl. as of Aug. 28—up 464,000 bbl. One year ago 42,618,000 bbl.

REFINERY RUNS 4,227,000 bbl. daily week ended Aug. 28—up 181,000. One year ago 3,705,000 bbl.

ONE of the results of the Petroleum Industry War Council meeting last week was the additional emphasis placed on the refining of sour crudes available principally from West Texas fields. The council reports showed that the present peak crude-oil production and plant operations will have to be expanded further over the final quarter of this year and during 1944 and the additional supplies available in this country will have to come largely from fields producing the sour crudes.

MOST refiners know rather definitely what will be required at their plants if they are to participate in the plan to expand the production and refining of these crudes. As has been explained in recent discussions appearing in this publication, the properties of these crude oils vary and this fact is reflected in the changes required in plant facilities. In general, refiners report they will have to make some changes in their topping and cracking operations and they will have to have new equipment and materials to treat the finished products. In most cases, these programs require more materials and equipment than is available under the present priority rules applying to refinery equipment. Plans are under way to make a quick survey of what the material requirements will be and then arrange through WPB to secure prompt deliveries.

IN the case of the smaller refiners who are not in a position to enter into long-time contracts for crude supplies the PAW program calls for a pooling arrangement which will protect both buyer and seller. The plan previously announced of making available 50,000 bbl. daily of the West Texas crude oil to refiners in District 2 is to be pushed as rapidly as possible. This includes protection to the buyer in the higher costs of tank-car deliveries from the fields. Despite the urgent need for the additional plant output it will take several weeks to install the equipment after the delivery of the required materials. In the case of the larger refineries investigations have shown in most instances that the refining of substantial quantities of this crude will require either the construction of new processing units or the rebuilding of existing units. Plans are under way to provide the materials for these operations. It is explained that this construction will not be permitted to interfere with the work now under way in completing war-product units.



Suppressed Military Data Prevent Accurate Analysis of Motor-Fuel Shortage

by Henry D. Ralph

WASHINGTON, D. C. — Efforts to explain the shortage of gasoline in the United States are a statistician's nightmare because so many of the essential figures are suppressed as military secrets.

With production of crude and refinery activity at high levels and civilian motoring curtailed, it would appear that there should be sufficient supplies of gasoline for the country as a whole, and that the only shortages would be local ones caused by insufficient transportation. However, officials now assert there is an over-all shortage of gasoline, and that the reason for this is the high level of military consumption.

Figures of military demand have always been closely guarded, but in a radio address last week Petroleum Administrator Ickes said: "Here is a figure which has never before been made public, but I have permission to give this to you now: the armed forces are now using 600,000 bbl. of all kinds of gasoline every day."

It is believed that this figure of 600,000 bbl. includes the total for Army, Navy, and Lend-Lease, all grades of motor and aviation gasoline, domestic and offshore, Atlantic and Pacific. It probably includes gasoline of United States origin used by the British in any area, but not other exports, and it is not stated whether it includes gasoline, if any, obtained by or through the U. S. Government from the Caribbean or other sources outside of this country. Neither is it stated how long military demand has been at this figure or how long this rate may be expected to continue.

Vital Figures Missing

Since the fall of 1941 the U. S. Bureau of Mines has not been permitted to issue statistics on production and consumption of gasoline in the detail formerly published. Its latest monthly report showed that daily average production of motor fuel in the United States in June 1943 was 1,641,000 bbl., but it did not publish figures on imports, exports and domestic demand.

The bureau's forecast of demand in September was for 54,500,000 bbl. of gasoline, which would be about 1,816,000 bbl. per day. The weekly report of the American Petroleum Institute stated that during the week ended August 28, 1943, production of gasoline in the United States was 12,420,000 bbl., which would average 1,774,000 bbl. per day. Another source gives the total demand for all gasoline in June 1943 as 1,846,000 bbl. per day.

Taking these figures and subtracting the 600,000 bbl. per day of military demand would appear to leave somewhere between 1,000,000 and 1,200,000 bbl. per day for domestic use, less whatever exports are being made other than Lend-Lease. Export figures are more closely guarded than military demand, for some unexplained reason, but it is known that some gasoline goes to Canada, and perhaps to other countries. It probably would be reasonable to estimate that 1,000,000 bbl. a day of all kinds of gasoline are available for domestic use in the United States.

During 1940, according to the Bureau of Mines, the daily average domestic consumption of motor fuel was 1,611,000 bbl. and in the first 9 months of 1941, during which it was permitted to publish the figure, the daily average consumption was 1,807,000 bbl.

This would indicate that military demands have made a tremendous hole in the amount of gasoline available for nonmilitary uses. Moreover, automobile registration at the beginning of 1942 was 5 per cent above that at the beginning of 1941, so that without restrictions on driving a similar increase in gasoline demand could be expected. Against this should be set the objectives of the Baruch report on which gasoline rationing was based, which was to reduce mileage of all motor vehicles by about 40 per cent. This would not necessarily mean a similar reduction in gasoline consumption because in city driving a reduction in mileage does not always mean a corresponding percentage reduction in gasoline consumption per vehicle. Gasoline rationing was more severe in the East, but probably did not meet the objectives completely in other parts of the country.

Against gasoline rationing must be balanced the increased use of gasoline for war activities, such as trucking, heavy bus travel, occupational driving by private cars in war-production centers, and increased use for farm tractors and in stationary engines.

Two other factors tend to decrease the amount of gasoline available. One is the continued withdrawals from stocks which has been going on for

SUMMARY OF FORECAST FOR SEPTEMBER 1943
(Barrels)

	Forecast		
	September 1943	August 1943	Actual September 1942
Demand for motor fuel*	54,500,000	55,500,000	51,848,000
Supply of motor fuel:			
Straightrun and cracked gasoline production	45,240,000	46,030,000	42,970,000
Natural gasoline used at refineries	5,160,000	5,170,000	5,108,000
Total refinery production	50,400,000	51,200,000	48,078,000
Other natural gasoline and imports	2,400,000	1,600,000	1,660,000
Decrease in finished stocks	1,700,000	2,700,000	2,110,000
Available supply	54,500,000	55,500,000	51,848,000
Crude-oil requirements:			
Per cent yield of gasoline from crude	37.70	37.70	37.87
Refinery crude required	120,000,000	122,100,000	113,474,000
Daily average	4,000,000	3,938,700	3,782,500
Domestic crude runs	119,200,000	121,700,000	113,228,000
Exports, fuel and losses	7,100,000	7,000,000	7,165,000
Total demand for domestic crude	126,300,000	128,700,000	120,393,000
Daily average	4,210,000	4,151,600	4,013,100
Decrease in domestic stocks	.....	.....	4,592,000
Actual production	.....	.....	115,801,000
Daily average	.....	.....	3,860,000

*The term "motor fuel" as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

Workers leaving one of the country's war plants indicates one of the irreducible factors in civilian consumption of motor fuel

some time. It is evident that consumption cannot remain above production indefinitely, and that as stocks move lower consumption may have to be curtailed even more sharply.

The other factor is the reduction in the yield of gasoline per barrel of crude run. This was accomplished by turning the lower fractions into fuel oil, and taking the top fractions for aviation gasoline, toluene, and military 80-octane gasoline. Recently the Petroleum Administration for War authorized refineries to increase their gasoline yield somewhat at the expense of fuel oil, but this offers no substantial relief. The Bureau of Mines reported that in June the yield of gasoline was 36.9 per cent of crude run to stills, compared with 36.4 per cent in May. Before the war, the yield ranged from 42 to 45.7 per cent. One authority estimates that only two-thirds as much motor gasoline now comes from a barrel of crude as was produced before the war. Therefore refinery activity is no indication of the amount of motor gasoline available for domestic-civilian consumption.

There is considerable evidence that the Government is turning to Caribbean sources of petroleum, either for importation into the United States or to supply foreign military demand and thus relieve the strain on domestic sources. Caribbean crudes generally yield a higher percentage of fuel oil than domestic crudes, and if either these crudes or the fuel oil from them is imported to this country it would relieve the shortage of fuel oil and permit larger production of motor gasoline from the domestic crudes refined.

Now that the military authorities have permitted the use of the figure of 600,000 bbl. per day gasoline demand, there would seem to be little reason for withholding statistics on United States production, civilian use and nonmilitary exports so that it would be possible to know how much gasoline there is, how it is being used, and how this compares with prewar uses.

Magnolia's West Texas Pipe Line Virtually Assured

WASHINGTON, D. C.—Construction of Magnolia Pipe Line Co.'s 335-mile, 12-in. crude-oil line from Midland to Corsicana, Tex., thereby giving the Permian basin additional outlet for 42,000 bbl. daily was virtually assured here this week. War Production Board, it was understood, had reached a favorable decision on the project and its elevation from a tentative to a definite construction status awaited only issuance of formal confirmation.

Addition of the Magnolia pipe-line project to the future transportation capacity out of West Texas and eastern New Mexico assures that producing district of increased outlet for a minimum of 107,000 bbl. daily by the middle or third quarter of 1944.

Current pipe-line capacity from West Texas is approximately 330,000 bbl. daily. Addition of the Stanolind Pipe Line Co.'s 16-in. line from the Slaughter field, West Texas, to Bretch, Okla., will supply initial transportation capacity of 65,000 bbl. daily. Right-of-way for the Stanolind line is being surveyed and the project has received definite WPB approval.

There is no assurance, of course, that all existing pipe-line facilities from West Texas, mostly terminating on the Gulf Coast, will remain in current service. With demand growing in the Middle West for additional Permian basin oil, it is possible that greater transportation capacity toward northern refining centers will be necessary.

Proposals that federal agencies absorb extra transportation costs on a minimum of 50,000 bbl. of Permian basin crude for tank-car shipment to the Middle West, pending completion of the Stanolind and Magnolia lines are under consideration.

The Petroleum Industry War Council last week endorsed proposals for movement of 54,000 bbl. of Permian basin crude daily to District 2 refining centers and recommended federal payment of the difference between freight charges and pipe-line tariffs. The PIWC's economics committee reported that the 54,000-bbl. supply of Permian basin crude was essential to the continued efficient operation of existing manufacturing facilities.

The Magnolia line to Corsicana will connect with existing facilities, permitting movement of Permian basin crude either north or south. For the duration, at least, the line probably will be operated for increasing deliveries to District 2 refineries. The Magnolia project will cost approximately $5,900,000, according to preliminary estimates.

PAW to Recast Foreign Committee Directives

WASHINGTON, D. C.—PAW is expected to issue soon a new directive covering activities and responsibilities of its foreign operations committee. It is understood this will not be of sweeping nature and has no relation to the activities of the Petroleum Reserves Corp., nor to the reorganization of the Office of Economic Warfare and coordination of many foreign activities through the State Department.

Purpose of the new directive is said to be to replace and consolidate old Recommendations 2, 9 and 38, and Plans 14, 24, 25 and 26 approved under them.

Sixty-Well Program for Arkansas Field Approved

EL DORADO, Ark.—The way has been cleared for launching of an extensive development program involving the drilling of 60 wells in the Stephens-Smart field of Columbia, Ouachita and Nevada counties, Arkansas.

This came with approval by the Petroleum Administrator for War of the application of the Arkansas Oil and Gas Commission which was filed in behalf of the operators in the field. Announcement of PAW approval was made by Alec M. Crowell, director of the state regulatory body, following receipt of a telegram from Ralph K. Davies, deputy administrator.

The new wells, which operators are expected to drill now that approval has been given, will have an estimated daily prorated production of 6,000 bbl. because the daily per-well allowable in the field is 100 bbl. It is estimated by engineers of the state commission that the reserve of recoverable oil in the pool will be increased some 12,000,000 bbl. by drilling of the 60 additional wells, boosting the reserve figures from 24,000,000 to 36,000,000 bbl.

While the PAW ruling has the effect of stating just where the wells are to be located, the order allows the drilling of 2 wells to each 40-acre tract instead of 1 well previously allowed. The field was originally produced on the basis of 1 well to each 10 acres, and it is believed that the new wells will be so placed as to make it possible for operators to go back to that basis after the war.

The PAW ruling provides that each of the new wells shall be drilled within 30 ft. of the center of 10 acres; each shall be drilled at least 450 ft. from any other drilling or producing well; each well shall be drilled at least 350 ft. from any lease line, property line or subdivision line which separates unconsolidated property interests; each shall be drilled with due diligence to maintain a vertical bore, and not more than 2 drilling or producing wells shall be located on any 40-acre tract.

Formal PAW approval followed one hearing by the state regulatory body, filing of the application and two conferences with PAW officials in Washington and Houston. The application was presented in behalf of the following operators: R. H. Crow, T. W. Lee, G. H. Vaughn, Joe K. Mahoney, McAlester Fuel Oil Co., Haynes B. Ownby, Durbin Bond, Boyrgeous and Gilardi, Fitzwater and McClerkin, Lechner and Hill and W. C. O'Ferrall.

Currently, there are 60 wells in the field, 1 to each 40 acres. Under proration each well produces 100 bbl. daily of sweet gravity oil from depths varying from 2,700 to 3,500 ft. Because of the lack of gas, the majority of wells are pumped, although a few are still flowing.

Dewey Made Assistant PAW Labor Counselor

WASHINGTON, D. C. — Appointment of George E. Dewey as assistant labor counselor in PAW's Office of Labor Counselor was announced last week by Petroleum Administrator for War Harold L. Ickes.

Mr. Dewey will assist Dr. Frederick H. Harbison on petroleum manpower problems. Samuel E. Hill, who was appointed assistant labor counselor in May 1943, continues in that post. Mr. Dewey previously had served as special assistant to Assistant Deputy Petroleum Administrator Bruce K. Brown.

The new assistant labor counselor has actually been performing his duties for the last several months, working with the petroleum industry's manpower subcommittees on production, refining, and natural gasoline in Districts 2, 3 and 5.

The manpower subcommittees prepared job descriptions and conducted studies on training times, both of which will be utilized by the various branches of the petroleum industry in conjunction with the setting up of replacement schedules and manning tables.

Administrator Ickes said that the subcommittees' job descriptions have been generally accepted by representatives of the War Manpower Commission and the Selective Service System in Districts 2, 3 and 5.

One of Mr. Dewey's principal responsibilities in his new post will be to develop plans to staff aviation-gasoline plants now under construction.

Three of PAW's operating divisions have assigned personnel to work closely with the Office of Labor Counselor on manpower problems directly related to the divisions' activities. Frank Brewster has been assigned those duties in the Natural Gas and Natural Gasoline Division; Robert Shirk in Production; and Al Roth in Marketing. Mr. Dewey will handle these problems for the Refining Division.

Mr. Dewey was born in Grant Park, Ill. He attended Purdue University from 1924 to 1926 and the Colorado School of Mines from 1927 to 1929, receiving a degree in petroleum engineering.

In February 1930 he joined Standard Oil Co. (Indiana) at the Whiting, Ind., laboratories where he was engaged in chemical engineering research. In September 1937 he was transferred to Standard's Chicago offices, where he headed the technical information division of the development and patent department.

Mr. Dewey remained with Standard of Indiana until September 1942, when he came to Washington as Mr. Brown's assistant.

Vast Improvement In Gasoline Is Predicted

Fifty to 70 miles to the gallon of motor fuel is visualized by petroleum chemists in the postwar era, according to W. M. Carney, chief chemist of the Lion Oil Refining Co. Sealed cooling systems with petroleum product liquids in both cars and planes, 100,000-mile tires, and 20,000-mile lubricating oil are also predicted in this period.

In discussing the possibilities for the chemical development of natural gas and petroleum, Mr. Carney said that the peacetime volume of aviation gasoline will be tremendous. "There will be higher quality gasoline for the ordinary motorist," he continued, "as well as plenty of aviation gasoline for expanded civilian use of airlines and private planes.

"It is predicted that soon after the war, new automobiles will be manufactured which will require 90-95 octane gasoline. Technical men say that automobile gasoline mileage can be increased 50 per cent or power 70 to 100 per cent by using the aviation-type fuel developed for war use. To get the most out of the new gasoline will require new motors which will be smaller and probably made of light alloy steel and the bodies made of plastics made from petroleum feed stocks. Some of the most revolutionary developments of research during the war period have been kept secret for military reasons; for example, one major oil company has been testing a new aircraft grease designed to lubricate at minus 100° F. which is expected to have useful postwar applications in refrigerator equipment," he said.

THIS WEEK

CRUDE PRICES—Two minor increases approved by OPA. . . . Pickens field, Mississippi, raised 17.5 cents; Smart field, Arkansas, advanced 10 cents. . . . Purchasers agree to absorb higher ceilings in both instances. . . . ¶PIWC calls OPA delay in granting general advance "inexcusable," repeats warning that prompt action is necessary, to avert supply debacle. . . .

TRANSPORTATION—WPB virtually assures approval of Magnolia Pipe Line Co.'s 335-mile, 12-in. crude line from Midland to Corsicana, Tex. . . . Outlet for Permian basin crude will be increased 107,000 bbl. daily by Magnolia and Stanolind Pipe Line Co. systems. . . . When two new projects are completed, total pipe-line capacity from Permian basin will be 437,000 bbl. daily. . . . ¶Washington agencies still considering payment of extra charges for 50,000 bbl. of Permian basin crude for movement by rail to District 2 refiners. . . . ¶PIWC considers transportation problem virtually whipped, urges concentration on increment of supplies. . . .

FOREIGN—PAW preparing new directive for Foreign Operating Committee. . . . Clarification of duties, consolidation of instructions sought. . . . This move, together with organization of Petroleum Reserve Corp., indicate much heavier reliance on foreign supplies, in domestic economy and for military requirements of United Nations. . . .

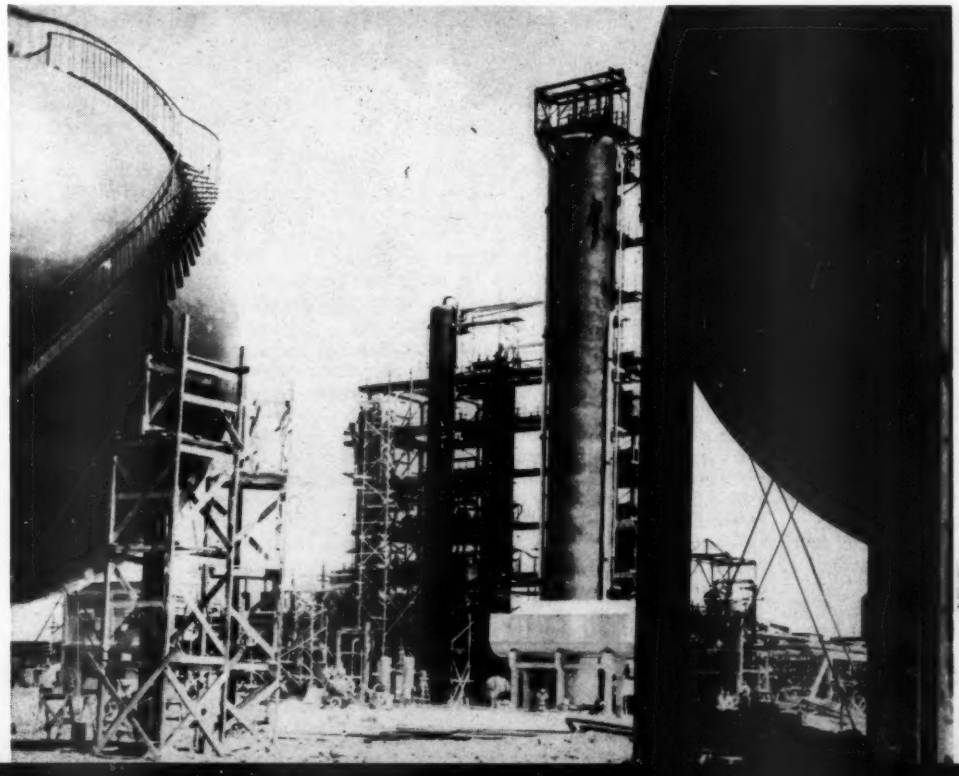
DRILLING—Sixty locations, 2 to each 40 acres, approved in Smart field, Arkansas. . . . Specific spacing pattern established for Iola field, Illinois. . . . ¶Total domestic completions rise slightly to 395 last week, up 16. . . . But rate still 773 off last year's pace. . . .

SUPPLY—East Coast index advances to 39.1 per cent of normal. . . . Inventories now stand at two-thirds of comparable 1942 level. . . . ¶Bureau of Mines forecasts demand for 4,210,000 bbl. of crude daily this month, 5 per cent higher than actual a year ago. . . .

RUBBER—Rubber Director Jeffers resigns with synthetic-rubber program substantially completed. . . . ¶OPA sets ceiling prices on synthetic tires at natural-rubber level, denying manufacturers' assertions of higher processing costs. . . .

EQUIPMENT—Frank Watts, PAW director of materials, promises sufficient steel for essential needs of industry. . . . Stresses cooperation of industry in projecting requirements over reasonable period absolutely essential to proper distribution. . . . Scarcity persists but pledge of adequate materials stresses elevated status of oil industry, in opinions of those running the war. . . .

REFINING—Pacific Coast operators instructed to discontinue sale of 40-cetane and better diesel fuel to all non-military consumers. . . . Move confirms exceedingly heavy drains in near future on California petroleum supplies, when Pacific warfare reaches projected scale. . . . Residual fuel inventories stacking up at several points, stressing unexpectedly heavy calls for gasoline and lighter fuel oils. . . .



This alkylation unit, recently completed at Pan-American Refining Co.'s Texas City, Tex., refinery, now is contributing to the supply of military motor fuel. PIWC last week revealed that military requirements for gasoline have increased 50 per cent since January 1 and currently are nearly 150 per cent above the average for 1942.

Compact Commission Will Study Operation of Gasoline Rationing

TOPEKA, Kan.—Gasoline rationing will be explored by the Interstate Oil Compact Commission at its quarterly meeting in Santa Fe, N. M., September 24-25, Gov. Andrew F. Schoeppel, commission chairman, said in announcing the formal program for the meeting. B. L. Majewski, vice president of the Deep Rock Oil Corp. and chairman of the Petroleum Industry War Council's marketing committee, will speak at the compact's general session Saturday on the whys and wherefors of gasoline rationing.

A report of the Texas Railroad Commission's recent survey of the oil producing capacity of Texas will be made by Col. Ernest O. Thompson, member of that body.

The performance of the Hobbs oil field in New Mexico, an outstanding model in conservation, will be presented by John M. Kelly, director of the New Mexico Oil Conservation Commission.

E. E. Pyles, vice president of Hancock Oil Co., Los Angeles, who is chairman of the production committee of District 5 for PIWC, will speak on the oil prospects of California.

"Natural Gas and its Post-War Uses" will be the theme of an address by Dr. Eugene A. Stephenson, professor of petroleum engineering of the University of Kansas.

Gov. John J. Dempsey of New Mexico will welcome governors from the oil-producting states, members of the commission and visiting oil men and entertain them at a dinner Friday night in the LaFonda Hotel.

LETTERS: OPA Disclaims Responsibility for Labor Group's Price Stand

IN the editorial of its August 19 issue The Oil and Gas Journal condemned a statement issued by the labor-advisory group of the Office of Price Administration which included a charge that the large oil companies were attempting a 1½-billion-dollar "steal" in the requested 35-cent advance in prices for crude oil. OPA asserts that the labor-advisory committee issued the statement of its own responsibility. A letter from O. D. Judd, price executive of OPA's petroleum branch, follows:

Judd's Criticism

Dear Mr. Willson:

Your editorial, "A Vicious Statement," in your issue of August 19, conveys an impression which, if true, would be most unfortunate.

The Petroleum Branch of the Office of Price Administration has always enjoyed the cooperation of the oil industry. This relationship has evidenced the industry's understanding of the difficult role this office is called upon to play, and because of such understanding we never have, nor do we now, consider it ethical nor advisable to attempt to deal with petroleum problems by hiding behind any outside group. We have always dealt with the petroleum industry direct on all problems, and in return have received the same straightforward treatment.

Price control, no matter how cooperative, can never be palatable to all interested parties on the more important issues. Business, as the individual, chafes under restraints regardless of how fair and equitable such measures might be. That is a natural and healthy reaction and one this office has always recognized. We have not and do not attempt to meet such conditions by pressure methods.

In the particular problem at hand, namely, our position with reference to a general crude-oil advance, we have rested our case on factual data which we believe to be more than adequate. We have not requested nor desired, contrary to your editorial, any outside aid in sustaining our position. We believe the issue is of such vast importance that the decision should be made on the basis of factual findings uncolored by emotional or group appeal.

The Office of Price Administration has no control over the recommendations or statements made by any advisory committee. These committees are appointed with the understanding that they will represent their particular segments of industry, that they will reflect the views of the group they represent without being bound by any specific rules of the Office of Price Administration as to their free expression of such views.

In view of the foregoing factual statements, we hope you will see your way clear to correct the impression conveyed by your editorial and thereby relieve us of the criticism originating with such misunderstanding of our motives and actions.

Journal's Reply

Dear Mr. Judd:

We have your letter of August 27 relative to the editorial appearing in our issue of August 19. Because we endeavor to report the activities and viewpoints of the Washington agencies accurately, regardless of our own opinions, we are publishing your letter in our September 9 issue.

In doing this we want to make clear that we are not retracting the conclusions in the editorial of which you complain. It is difficult for us to visualize the workings of the Office of Price Administration with its broad war powers and responsibilities, which would permit an advisory group, appointed by the head of that agency, to issue a statement without official knowledge.

Furthermore, assuming that the release was made by the labor-advisory group without consulting the agency which it is expected to serve, we feel that there was a plain duty of repudiation and correction by OPA officials. Surely this is the least that could have been expected from an agency which, as you state, "has always enjoyed the cooperation of the oil industry." The statement obviously was designed to place the petroleum industry in a wholly false position without regard to facts. It had received immediate national distribution through press and radio.

We want to emphasize that the petroleum industry, as we contact it from day to day throughout the oil country, does not agree that the "factual data" to which you refer in any way justifies the price administration's refusal to approve the requested advances in crude oil. The Petroleum Industry War Council reiterated this industry's condemnation of OPA's position last week. The results of the delays are daily becoming more apparent in petroleum shortages.

I fully appreciate your own desire to be fair in appraising the problems that are presented. It is in the same spirit that the opinions expressed in previous issues of this publication and in this letter are presented.

C. O. WILLSON, Editor.

Uniform Spacing Pattern Set for Iola Field

CHICAGO. — The uniform well-spacing pattern for the Iola field in Clay County, Illinois, has been designated as the center of the southeast quarter of respective quarter-quarter sections in a ruling issued in Administrative Letter 10 by R. B. Kelly, director of production for District 2.

Associated's Aviation-Fuel Plant Nearing Completion

DUNCAN, Okla.—The first refinery in Oklahoma built entirely for aviation-fuel manufacture is being pushed toward completion as fast as allocation of equipment permits. The plant of Associated Refineries, Inc., here will cost about $10,000,000, is financed by Defense Plant Corp., and managed by a corporation organized by eight local refinery companies. The eight cooperating refiners will supply charge stocks for the coalition plants.

The companies associated in this refinery are: Anderson-Prichard Refining Corp., Bell Oil & Gas Co., Ben Franklin Refining Co., Cosco Oil Co., La Salle Petroleum Co., Panhandle Refining Co., Rock Island Refining Co. and W. T. Waggoner estate.

President and general manager of the new company is M. Lloyd Freese, vice president of Bell Oil & Gas Co., Tulsa, with L. B. Simmons, president of Rock Island Refining Co., Indianapolis, Ind., as chairman of the board.

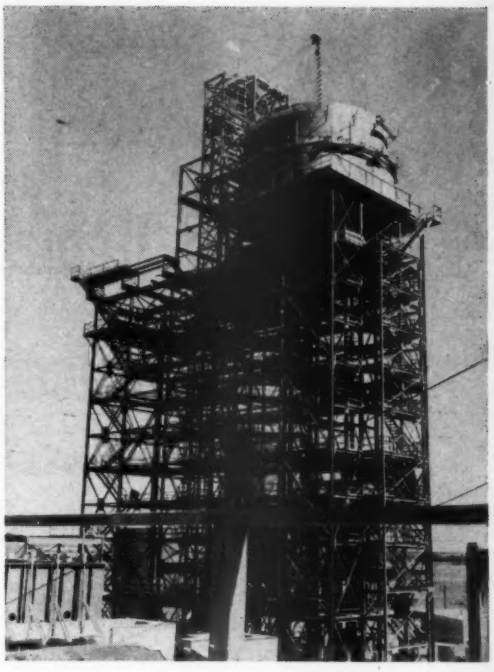
Fluid Cracker Nucleus

One of the units included in the plant is a fluid-catalytic-cracking system, built under Standard Oil Co. (New Jersey) patents, an imposing 200-ft. structure which will produce the high octane base stock for the finished fuel. Synchronized with this unit and in proper capacity rating with it is a catalytic alkylation unit, employing anhydrous hydrofluoric acid as the catalyst, for producing alkylate (chiefly isooctane) as a second component of aviation fuel. An isomerization unit for producing isoparaffins such as isobutane, is also included. These last two units are licensed under Universal Oil Products Co. patents and designed by that company's engineers.

Construction of this refinery has been hampered recently by bad roads which slowed down the work seriously. Strong efforts are being made to correct this situation and the roads have been greatly improved although much remains to be done to provide the required highway facilities for transporting heavy equipment to the job.

Also, housing accommodations for construction workers and refinery employes have been inadequate and the situation is still serious, hampering the progress of the work. One hundred housing units to be built soon, probably under the National Housing Administration, will relieve this situation to some extent.

Operations in the individual refineries associated in this project are being revamped in order to supply the charge stocks needed to operate the new plant. This insures that these plants will be operated during the war period, supplying required civilian petroleum products and consuming crudes produced in this area as has been the case heretofore.

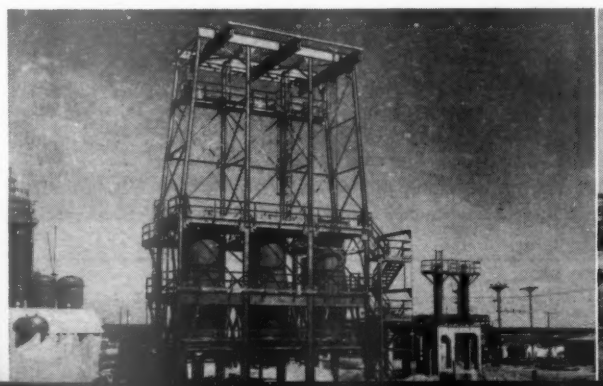


The fliud catalyst cracking unit well on its way to completion with the catalyst hopper being assembled atop the network of supporting structures

The plant is being built by Frick-Reid Supply Corp., with W. G. Baker as chief engineer in charge. In addition to the problems of constructing the units of the plant proper, several other problems presented themselves. Permission was obtained from Washington for 60 new and rebuilt housing units. Currently, six units, each including four apartments, are under way. One hundred more single units are applied for, the total number of employes being about 400.

H. F. Miller is personnel manager, and has recently been located at the plant. Walter D. Manz is general superintendent and chief engineer of the plant, engaging a staff of some 20 engineers.

M. Lloyd Freese, circle, is president and general manager of Associated Refineries, Inc., and vice president of Bell Oil & Gas Co., Tulsa. Below, left: Alkylation catalyst cases for the reaction which is one of the plant's important operations. Below, right: General view of the plant near Duncan which is converting open range into an industrial area.



PIWC Told of Steep Rise In Oil Demand as Ability To Produce Falls Behind

by Henry D. Ralph

WASHINGTON, D. C.—The Petroleum Industry War Council meeting here September 1 and 2 received a pessimistic report from its committee on petroleum economics which forecast demands for petroleum products during the coming year far greater than the capacity of the industry to produce.

The council adopted a resolution placing the blame for an oil shortage on the Government's failure to increase the ceiling on the price of crude oil. It also adopted a resolution asking the Petroleum Administration for War to remove tar from the restrictions on asphalt in Directive 45 on the ground that there is now a surplus of tar, military requirements are falling off, and roads are deteriorating for lack of maintenance.

Another resolution called on government agencies to provide for the production of new heavy-duty tank trucks and repair parts to maintain highway transportation of petroleum products. The meeting of the council will be in Washington October 6, but the November meeting will be held in Chicago November 8 in conjunction with the annual meeting of the American Petroleum Institute.

Text of Price Resolution

"The United States," said the council in its price resolution, "is entering a period where it must be recognized that there is a shortage of petroleum and its products. This shortage is already causing serious restrictions on the civilian use of petroleum products. Unless some early action is taken to remedy the situation we must ultimately face further restrictions in essential civilian and industrial uses.

"The declining productive capacity is the direct result of an arbitrary and inadequate price ceiling, established and maintained contrary to the considered judgment of the petroleum industry and of the petroleum administrator for war to whom the president of the United States delegated the responsibility of providing adequate petroleum products.

"Realizing that the nation's producible surplus was not sufficient to carry on a great world war and to supply essential civilian needs, the Petroleum Industry War Council first reported on February 4, 1942, to the petroleum administrator that price ceilings on crude oil were inadequate to stimulate the necessary exploration and productive activity. As the war program developed, the council followed this report from time to time with other studies and recommendations to the same effect, particularly in October 1942, November 1942 and February 1943. Similar statements and recommendations have been made in the reports to the council by the economics committee on many occasions.

Costs Continue Rise

"The petroleum administrator has vigorously and repeatedly recommended to the Office of Price Administration that the price ceiling on crude petroleum and its products be increased; his recommendations have been rejected by OPA and are now pending on appeal to the Office of Economic Stabilization, and no relief has yet been granted. The recommendation of the petroleum administrator for war for an increase in the ceiling price was made on a basis of an average-minimum increase that then appeared necessary to encourage further production and exploratory activity. It was made long ago. Conditions have changed since the recommendation was made. Costs of production have further increased. Costs of exploration have further increased. In many instances it costs more to discover and produce a barrel of oil than the price now received.

"The Petroleum Industry War Council again calls attention to the neces-

(Continued on Page 36)

TABLE 1

Projection of Foreseeable Supply, Domestic Ration Requirements and Military Demand and Apparent Deficiencies, Second Half 1943, and Year 1944 by Quarters
(In thousands of barrels daily)

	1943		1944			
Foreseeable supply:	Third quarter	Fourth quarter	First quarter	Second quarter	Third quarter	Fourth quarter
Crude production*	4,185	4,289	4,262	4,321	4,398	4,366
Natural gas and condensate	264	282	288	283	283	288
Benzol	2	2	2	2	2	2
From crude stocks	36	112	143	112	81	59
From product stocks†	(104)	107	147	(95)	(136)	(12)
Scheduled imports	45	8	4	4	4	4
Total foreseeable supply	4,428	4,800	4,846	4,627	4,612	4,707
Total domestic ration requirements and military demand	4,561	4,915	5,000	4,893	4,935	5,219
Apparent deficiencies	133	115	154	266	323	512

*Maximum efficient rate except as limited by transportation. †Figures in parenthesis are accumulations, primarily of heating oils, to provide for domestic winter requirements.

TABLE 2

Crude-Oil Production Statistics (Not Including Natural Gasoline and Condensate)
(Daily averages in thousands of barrels)

		1943 second half		Year 1944	
	1942 year average	1943 July average	Contemplated prod.	Estimated M.E.R.*	Contemplated prod.	Estimated M.E.R.*
District 1	73	69	67	67	64	64
District 2	1,048	948	932	930	857	861
District 3	1,880	2,194	2,320	†2,570	2,497	†2,570
District 4	114	123	126	124	125	123
District 5	680	774	794	795	794	794
Total United States	3,795	4,108	4,239	4,486	4,337	4,412

*These are the M.E.R. figures used in Report 14, dated July 12, 1943. †One year beginning May 1943.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Complete Reports Needed

THE explanation of the petroleum administrator that 600,000 bbl. daily of gasoline are now required for the armed forces and the announcement giving the percentages of gasoline production east of the Rocky Mountains that will be required by the military now and later, are steps in the right direction. They serve to explain in part why gasoline-rationing restrictions have been tightened.

If, as has been indicated, additional reductions in civilian use of gasoline are to be made effective, more explanations are in order. In this connection, there are no valid reasons why there should not now be a showing of hands in the matter of demands not only for gasoline but for all other petroleum products.

There were military situations in the early stages of this country's participation in the war which made it mandatory that certain production plans and the distribution of supplies should not be made public information. But we have now entered upon a full-scale offensive and there is little secrecy as to how it is being carried on so far as general production activities are concerned.

If the enemy still has time to do anything but defend himself, he knows the production status of war machinery requiring petroleum that is now being used against him. This includes ships, airplanes and motor vehicles.

In regard to domestic gasoline needs, most of the duty of explanation rests with the Office of Price Administration. Consumers would like to have an understandable breakdown of gasoline distribution, other than the military. After the 600,000 bbl. daily military requirements are provided this month, there is still in excess of 1,200,000 bbl. daily of gasoline available.

Some of it will be exported and the rationing programs of countries getting this gasoline would be of interest. Then there are the domestic supplies, which are still approximately equal to the total 1929 consumption. This includes the demands of 5 million commercial vehicles on which no accurate wartime figure has been released.

After that come the millions of family cars which are the backbone of this country's transportation system and upon which the maintenance of the war-production program depends. Consumers are asking about the effectiveness of the rationing procedure. They want to know how much gasoline is being consumed by the base A coupons and how much by the supplementary coupons.

There are many who have evidence indicating that the weakness in the entire rationing program, involving present shortages, rests with OPA controls. If there are further reductions in coupon values, millions of car owners will have to be convinced that this rationing is being enforced equitably and efficiently. Their information indicates that despite the growing military demands there should be sufficient gasoline to take care of the legitimate supplementary needs and still leave 3 or more gallons weekly for the family car.

The main thought here is that every patriotic American is a war worker. All must have petroleum to do their part. Nothing is more important in the maintenance of civilian morale.

Emergency transportation difficulties have largely been solved, so the production problem now is a matter of field and refinery output. Consumers have a right to know just what that situation is, coupled with comprehensive information as to the distribution of these now limited supplies.

PIWC Told of Steep Rise in Oil Demand

(Continued from Page 34)

sity for an immediate and substantial increase in the price of petroleum and its products. The situation has been permitted to become progressively worse. The inexcusable delay in granting proper price increases from the abnormally low level at which they were frozen has occasioned loss of manpower to other industries, loss of productive capacity, increased difficulties in the discovery and production of petroleum and accentuated restrictions on the use of its products for essential civilian and industrial needs. A price that might have been adequate months ago is now inadequate.

"The national interest is not now being properly safeguarded and remedial steps must be taken without further delay.

"Therefore," the council concluded, be it resolved that this statement be brought to the immediate attention of the petroleum administrator for war."

Military-Gasoline Requirements 150 Per Cent Above 1942 Average

THE sharp rises in military requirements for gasoline were emphasized by the economics committee which summarized the current outlook in the following 12 points:

1. The military requirements now indicated as being required from the United States, plus rationed civilian demand, and domestic industrial requirements, combine to confront the industry with a total demand which will be increasingly difficult to fill from domestic sources. As to gasoline, for example, war demands are presently taking about 31 per cent of domestic output and this percentage is steadily increasing.

2. While the military requirements for gasoline have increased by more than 50 per cent since January 1 and nearly 150 per cent above the average of 1942, new transportation facilities have fortunately kept pace with this demand and no longer constitute a serious bottleneck. However, this unexpectedly large military demand, coupled with civilian gasoline consumption substantially in excess of that which gasoline rationing was designed to achieve, have combined to create a serious situation in that:

(a) Available domestic crude supplies will no longer be able to fill all the prospective demand heretofore assigned to this country,

(b) Refining facilities in most parts of the country are approaching capacity,

(c) Gasoline stocks have been drawn down at excessive rates in the country as a whole, and are at distress levels on the East Coast.

(d) On the other hand, higher crude runs, more use of heavy crudes and of less efficient refining units have resulted in unexpectedly large production and stocks of residual fuels, reversing the situation of last winter.

3. The resultant supply and demand estimates are probably best shown in Table 1 (Page 34.)

4. The above indicated deficiencies occur even though all domestic fields not now producing at their maximum efficient rate are brought to that level as soon as possible, or, as soon as transportation is provided from those producing fields not now sufficiently equipped with such facilities. Foremost among these fields are those of the Permian basin in West Texas-New Mexico.

5. It will be noted that in the above table the supply credited to imports reflects only nominal amounts. To reduce the deficiencies indicated it will be necessary to increase imports or draw more of the United Nation's supply from foreign sources, if wasteful dissipation of this country's reserves is to be avoided.

6. In order that the deficiencies be no greater than those set forth, transportation and refining arrangements must be made for refiners to handle during the last half of 1944 about 240,000 bbl. daily more West Texas high-sulfur crude of which 54,000 bbl. daily is scheduled for October 1943; 90,000 additional in the second quarter of 1944, which represents part capacity of both the Stanolind and Magnolia lines, and 35,000 bbl. additional in the second half of 1944, representing the scheduled capacity of these lines. The remainder will then have to be moved through expanded capacity of then existing pipe lines, by direct tank-car movement, or through new pipe-line capacity.

7. Dislocation as between products will make it necessary for refiners east of the Rockies to adjust yields to make more gasoline, kerosene and distillate fuel, and less residual fuel. In many refineries this cannot be done without interference with war products of which heavy fuel is a necessary byproduct. Also, the marginal refining units which are now having to be brought into operation in order to meet increasing demands, cannot in general produce as low yields of fuel oil as the more complete units already operating. It, therefore, appears that government pressure to convert oil-burning installations to coal should be suspended, especially in view of the danger of a coal shortage.

8. In District 5 the projected figures indicate a severe problem of supply, especially in heavy fuel, will develop after the first quarter of 1944. With additional available transportation facilities, District 4 will find itself in a position to supply some of the demand in adjacent districts.

9. Completion of various pipe-line projects and the apparent easing of the tanker situation should permit the elimination of some of the more inefficient transportation operations, thereby contributing to the saving of manpower, rubber and gasoline, and reducing the burden on the railroads.

10. Inventories, except for residual fuel, are at or near, minimum levels and cannot be depended upon to supply large portions of the demand after the first quarter of 1944.

11. In the light of the foregoing situation the necessity of avoiding wasteful or unnecessary use of petroleum products is apparent if we are to continue to meet the increasing demands of the military forces. There should be better public understanding of and support for measures designed to avoid wasting products which are so vital to the war effort.

12. In view of the heavy demands for products projected for District 5, the committee again urges that the development of the Elk Hills Reserve in California should no longer be neglected. These reserves are particularly rich in aviation gasoline and fuel oil so necessary for the prosecution of the war. In the light of experience, this development can be conducted most speedily and efficiently by the oil industry rather than the Government. Either the present negotiation, looking to unitization, should be promptly completed or the government lands should be leased by sections at public bidding subject to unitization. A prompt solution is important to the oil supply of the Pacific area.

Production at M.E.R. In Most Districts

WARNING was repeated by the PIWC economics committee that the maximum efficient rate of production already has been reached in most fields and probably exceeded in a few. The Permian basin, Elk Basin and Elk Hills, in Districts 3, 4 and 5,

respectively, are the only exceptions where substantial increases in current output are practical.

The low price of crude oil is becoming more and more a retarding influence in the provision of adequate supplies of this raw material. The critical importance of petroleum in the war economy requires a favorable consideration of the repeated recommendations of the PAW for a price stimulus. An immediate increase in the discovery effort is necessary; additional secondary-recovery projects should be commenced and steps taken to prevent premature abandonment of small wells. The low ceiling prices of crude oil in the face of greatly increased costs is generally recognized as the principal obstacle to obtaining adequate supplies of this raw material.

As will be seen from Table 2 (page 34), all areas except District 3 are indicated as producing at, or slightly above their M.E.R. throughout 1944 while the latter district reaches its maximum during the second quarter of next year.

Oil Men to Address Controllers Institute

NEW YORK.—Oil-company executives will play important parts at the twelfth annual meeting of the Controllers Institute of America, which will be held September 20-22 in the Waldorf-Astoria, New York. T. C. McCobb, controller of the Standard Oil Co. (New Jersey), is president of the Institute, and E. B. Nutt of his firm is chairman of the convention committee.

J. C. Anderson, assistant controller of the Standard company, will preside at a session on "What Is Ahead in Social Security?" on the opening morning.

E. Chester Peet, assistant treasurer and assistant secretary of the Shell Oil Co., Inc., New York, will be chairman of a group conference on "Federal Reports and Questionnaires," which is scheduled for the morning of September 21. That afternoon, Stanley W. Duhig, treasurer of the Shell Union Oil Corp., New York, will preside at a general session on "Administration of the Security and Exchange Acts."

At another group conference Warren M. Maule, secretary and treasurer of the Petroleum Finance Corp. of Texas, New York, will preside. The subject for discussion will be "Tax Problems," and Mr. Maule will speak on "What's Wrong With Federal Taxes?"

William L. Naylor, assistant controller of the Gulf Oil Corp., Pittsburgh, Pa., will preside at a third group meeting, to be devoted to manpower problems. Mr. Naylor is president of the Institute's Pittsburgh Control.

Federal Order Digest

PAW Actions

Refining—Petroleum Directive 71: Prohibits sale or purchase by other than military and lend-lease agencies of 40-cetane or higher diesel-engine fuel in District 5, effective September 13.

Labor—George E. Dewey, previously special assistant to Bruce K. Brown, assistant deputy administrator, appointed assistant to Dr. Frederick H. Harbison on petroleum-manpower problems, effective September 2.

WPB Regulations

Dispensing Equipment—P-98-e: Authorizes individuals who own or rent equipment for handling petroleum products for their own private use to use preference rating of AA-5 and controlled-material symbol of MRO-P-98-e, effective September 1.

Natural Gas Line — Formal statement definitely pledges approximately 215,000 tons of steel for 1,200-mile line from Southwest to Appalachian area, issued August 30.

Steel Pressure Pipe—L-211, Schedules 11, 12 and 13: Establishes standard specifications for steel pressure pipe, steel pressure tubes and other types of steel pipe, issued August 30.

OPA Regulations

Crude Oil—MPR 436, Amendment 1: Advances ceiling price of Pickens field, Mississippi, crude 17.5 cents per barrel, making 40 gravity $1.18 per barrel, effective September 8.

Residual Fuel Oil—RPS 88, Amendment 125: Increases ceiling prices on residual fuel oil in eastern Montana 2 to 5 cents per barrel, now ranging from 80 to $1.34 per barrel, effective September 8.

Retail Prices — MPR 137, Amendment 36: Abolishes requirement that sellers of petroleum products at retail file with War Price and Rationing Boards their prices, any subsequent increases and other related information, effective August 28.

Used Pipe—RMPR 230, Amendment 1: Sets specific maximum prices for joint welding and prime coating of reusable iron and steel pipe, effective September 4.

Tires—RO 1A, Amendment 49: Expedites distribution of serviceable tires taken from scrap piles of Rubber Reserve Corp., effective August 28.

NRLB Rulings

Case R-5898: Establishes International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America, Local 208, AFL, as collective bargaining representative of Tide Water Associated Oil Co., tank-truck drivers, package-truck drivers, plantmen and working foremen.

Case R-626, Third Supplemental Amendment: Excludes long list of specific job classifications as well as all other supervisory employes with authority to hire, promote, discharge, discipline, or otherwise effect changes in the status of employes, or effectively recommend such action from Shell Oil Co., Inc.'s contract with Oil Workers International Union, Local 367.

ODT Regulations

Petroleum Transport — Establishes tank-truck section in the Division of Petroleum and Other Liquid Transport; abolishes petroleum-carriers section, issued August 20.

Liddell Appointed PAW District 2 Supply Chief

CHICAGO, Ill. — Appointment of J. W. Liddell as director of supply of the Petroleum Administration for War, District 2, was announced last week.

He joined the Transportation Division of the Washington staff of PAW in November 1942 after 23 years in the oil business, on leave of absence from Continental Oil Co. in Chicago where he was manager of railway sales.

In 1920 he was traffic manager of Montrose Oil Refining Co., in Fort Worth, Tex. He resigned in 1924 to become traffic manager of National Gasoline Co., also in Fort Worth. Later in 1924 he accepted the position as traffic manager of Texhoma Oil & Refining Co., in Wichita Falls, Tex.

In 1926, when Continental Oil Co. bought the Texhoma company, he remained as traffic manager. In 1929 he moved to Denver as assistant manager, railway sales and traffic, for Continental Oil Co. In 1936 he moved to Chicago in the same position, and in 1941 he was appointed manager of railway sales for Continental in Chicago.

Pure's Marcus Hook Plant Damaged by Fire

MARCUS HOOK, Pa.—The grease-compounding building at Pure Oil Co.'s refinery here was destroyed September 4 by fire and accompanying explosions of naphtha and other volatile petroleum products.

Problems of Condensate Production Studied by Gulf Coast Operators

by E. H. Short, Jr.

HOUSTON, Tex.—The final mechanical stage has been set in the Waller County, Texas, Katy gas field, for conducting exhaustive field research work on some of the involved problems associated with the production of distillate wells. This work, sponsored by the Natural Gasoline Association of America, is a cooperative project participated in by a number of the operators interested in this particular type of production.

There are several different methods employed in sampling, and also in determining the gravity and content of a two-phase gas stream. However, with the growing importance of this type of production during the past 2 or 3 years, many operators have voiced the need for a more advanced technical knowledge of distillate-well problems.

The principal purpose of the research study is to develop and record all data which has promise of promoting more efficient operations in the repressuring, cycling and pressure maintenance phases of distillate-well production. There are several related problems to receive individual study. However, the primary objective is to work out, or discover, a sampling technique for application to a two-phase gas stream which promises a maximum degree of accuracy with a minimum cost in time and equipment. It is also planned to carry out experimental work on gravity and content determination with the idea of establishing simple, accurate and practical methods for testing samples.

The gas for these tests will be supplied from well No. 9 in the Katy unit, which has a two-phase gas capacity of 30,000,000 cu. ft. per day at a well-head pressure of 2,500 lb. per sq. in. A full scale testing layout has been installed near the well, as shown in Fig. 1. Inspection of the testing equipment indicates that strength, flexibility and conservation of equipment received much consideration during the process of designing the layout. Upon completion the equipment was subjected to a 4,500-lb. water-pressure test.

Flow of Gas

In Fig. 1, the separator located at the extreme right is the receiver for the two-phase well stream. This separator, however, may be bypassed so that the full well stream may be directed to the vertical sampling unit shown in the center of Fig. 1 This sampler is equipped with a vertical meter, as shown in Fig. 2. From the vertical sampler, the gas passes through a horizontal sampler and meter, thence to the separator shown on the extreme left in Fig. 1. It is planned to measure gas from this sep-

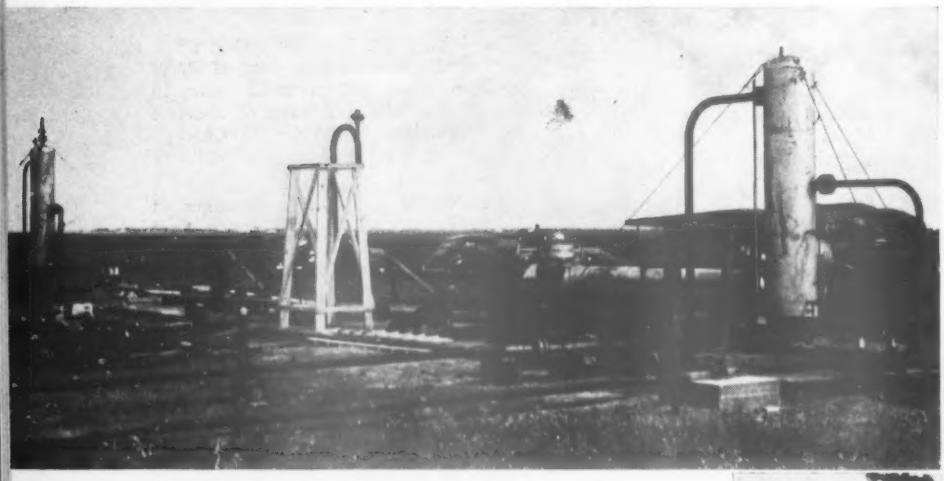


Fig. 1 (left)—Layout for conducting research study on distillate well problems, Katy field, Texas.

Fig. 3 (below)—Meter on horizontal tester. Discharge separator in background.

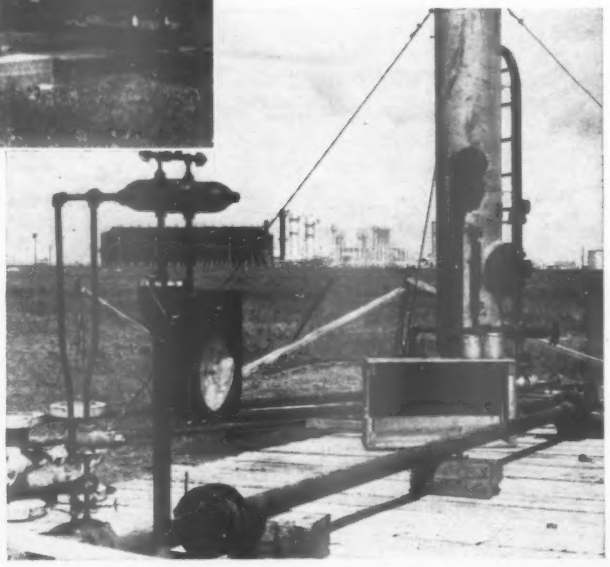
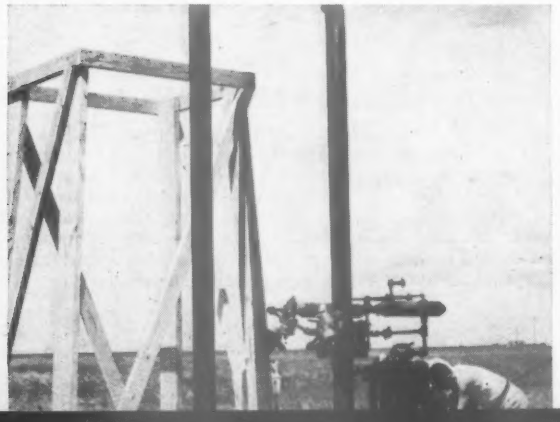


Fig. 2 (below)—Vertical meter for measuring gas stream through vertical tester



Truly Universal

ALL catalytic and other petroleum refining processes, research and know-how are made available to every refiner and engineer contractor.

A licensee chooses his own contractor, U.O.P. works with both.

Experts train and educate the licensee's personnel in the new technique.

Technologists maintain continuous plant contacts to impart the latest techniques for the promotion of refining efficiency, progress, and safety.

Universal licensees build for the future.

U.O.P. is not a contractor, manufacturer or seller of equipment—but a pioneer in petroleum research and technology.

CATALYTIC CRACKING	HYDROFORMING
REFORMING	DEHYDROGENATION
HYDROGENATION	POLYMERIZATION
ALKYLATION	UNISOL TREATING
ISOMERIZATION	RETREATING
THERMAL CRACKING	SWEETENING
U.O.P. CATALYSTS	U.O.P. INHIBITORS

COMBINATIONS, MODIFICATIONS AND NEW APPLICATIONS OF ALL THESE PROCESSES

NEW PROCESSES IN THE MAKING

OIL IS AMMUNITION—USE IT WISELY

Universal Oil Products Co.

Chicago 4, Ill., U. S. A.

CARE FOR YOUR CAR FOR YOUR COUNTRY

Petroleum Process Pioneers

For All Refiners

The Refiners Institute of Petroleum Technology

Fig. 4 (left)—Meter for measuring gas production from discharge separator

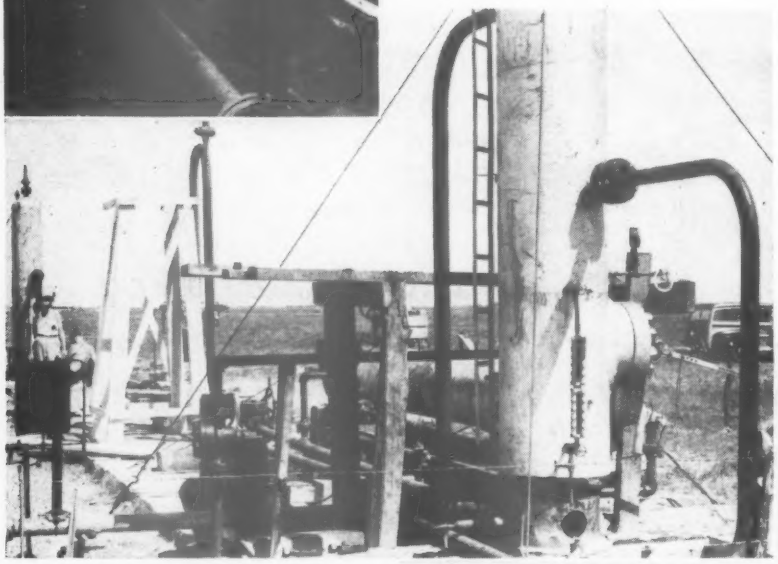


Fig. 5 (above)—End view of layout, showing intake separator in foreground

arator at a pressure of approximately 900 lb. as it goes through the meter shown in Fig. 4. Gas from both the vertical and horizontal samplers may be passed to a testing unity where the sample may be checked at the same pressure and temperature carried in the discharge separator shown both in Fig. 3 and 4.

The flexibility of the testing unit is apparent when problems involving different quantities of liquid are to be studied. The gas from the separator shown on the extreme right in Fig. 1 and close up in Fig. 5, may be divided, part of it being passed through a choke valve, and the other portion, after passing through a meter, may be mixed with the desired quantity of liquid. After the liquid is added the mixture is passed through both sampling units and thence to the discharge separator. The separator shown in the foreground of Fig. 5, or the intake separator has been calibrated so that accumulated liquid may be gaged. The purpose of the horizontal tank shown in Fig. 6 is to act as an accumulator for the distillate production. It may also be filled with water for injection into the gas stream to further increase the liquid-gas ratio.

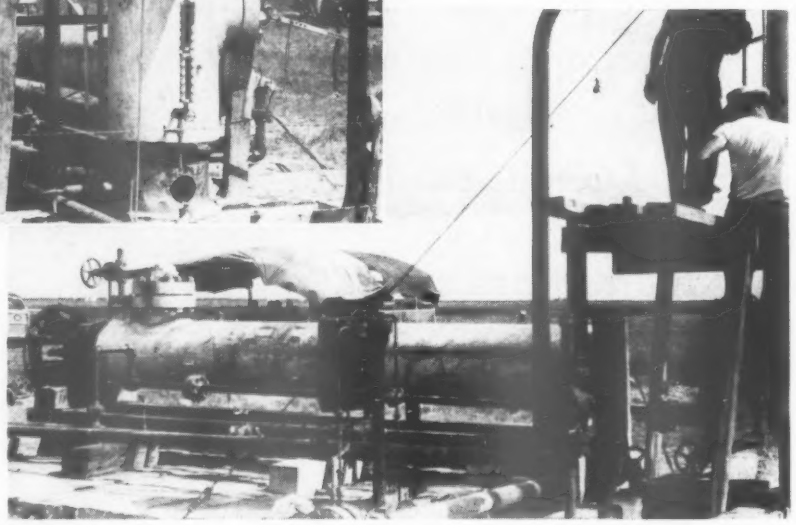
Related Tests

In connection with the study which will be made to arrive at a simple and practical method for sampling a two-phase gas stream, it is also planned to make a number of tests on various types of sampling tips, mixing devices, and the various separation units. Another rather important phase of the test work includes a study of stream-velocity effect upon the sample and the observed difference in samples obtained at different locations of the sampling tips in both vertical and horizontal samplers. Calculation of flow rates will be made from the vertical meter shown in Fig. 2, and the horizontal meter shown in Fig. 3. The gravity of the fluid to be used in the calculations will be determined from the gas at 900-lb. per sq. in. pressure vented from the discharge separator.

The equipment was set up under the supervision of W. A. Van Hook and Carl J. Mantzell, Stanolind Oil & Gas Co. Drs. G. G. Brown and D. L. Katz, University of Michigan, have been retained by the N.G.A.A. to carry the proposed research work through to completion.

According to William Lowe, secretary of the N.G.A.A., the interest of the companies participating in the research has enabled the work to progress at a satisfactory rate.

Fig. 6 (below)—Distillate accumulator



Pickens Field Ceiling Raised 17.5 Cents a Barrel

WASHINGTON, D. C. — Ceiling price for crude oil produced in the Pickens field, Mississippi, was raised last week 17.5 cents per barrel, effective September 8, by the Office of Price Administration.

The new maximum price at the receiving tank for 40-gravity crude from the Pickens field, which is in Yazoo and Madison Counties, is $1.18 per barrel, compared with a previous ceiling of $1.005. Daily production from the Pickens field varies from 4,000 to 4,400 bbl. daily at the current rate of operations.

Prompt Return Urged of Liquefied Gas Drums

WASHINGTON, D. C.—The Petroleum Administration for War last week urged all dealers, distributors and consumers of liquefied petroleum gas to speed up the handling and return of gas cylinders.

"Despite the heavy war demands for liquefied petroleum gas," PAW said, "we must face the fact that only a relatively few additional containers can be made available at this time to the industry. It is imperative, therefore, that no existing cylinders remain idle and that there be no delay in the turnover of drums."

Higher Toolpusher Pay Proposed Before WMC

DALLAS, Tex.—What to do about the pay of the toolpushers who now get less than drillers is before the Salary Stabilization Unit of the War Manpower Commission at Dallas. The difficulty has come about by the increase in the monthly wage of employes paid by the hour while supervisory employes paid by the month have their wages frozen. This has led to a number of toolpushers requesting that they be allowed to go back to drilling rather than endure the responsibilities of supervising operations for less money than paid drillers.

The wage differential is considerable. The normal wage for toolpushers was somewhere between $325 and $500 per month with only a few getting the higher figure. Average pay for toolpushers was, and is, about $400 per month. Drillers were paid on an hourly rate of $1.50 up to $1.81. During normal prewar times they worked 5 days a week but now work 7.

Taking the rate of one company, not the highest, of $1.625 per hour, the pay for a 5-day week was $65 or $282 per month. Working a 56-hour week raises this pay to 110.50 per week or $480 per month. In addition, some companies allow driving time of 1 hour per day. In such cases the pay becomes $128.50 per week or $555 per month. This is due to the time and one-half for time over 40 hours plus double time for the seventh consecutive day worked.

Two things add to the need for the adjustment. The first is entirely personal and the second has to do with the increased difficulty of performing the job of toolpusher.

The scarcity of material, the difficulty of obtaining many items, and the lack of experienced crews all add to the worries of supervisors. In addition, much of the equipment is getting rather worn, particularly the drill pipe, and fishing jobs are becoming more numerous.

Both drilling contractors and oil companies operating drilling rigs are hopeful that the WMC will permit them to increase the pay of toolpushers, at least enough to modify the current differential to a reasonable point.

MRO Order Provided for Privately Owned Pumps

WASHINGTON, D. C.—Individuals who own or rent equipment for handling petroleum products for their own private use are granted a preference rating of AA-5 and a Controlled Materials Allotment symbol of MRO-P-98-e for the purpose of maintaining or repairing worn-out parts of such equipment, under the terms of Preference Rating Order P-98-e issued September 1 by the War Production Board.

PAW officials, to whom administration of the order has been delegated by WPB, explained that thousands of individuals owned of rented equipment for handling petroleum products for their own personal or business use but not for resale. Typical examples are such items as gasoline pumps, etc., on farms or in connection with small business enterprises, or "bottled gas" equipment for household use.

Franklin to Discuss PAW Plans for Production

Wirt Franklin, special field assistant to Ralph K. Davies, deputy petroleum administrator, will outline the program for increasing crude-oil production before Mid-Continent operators at a noon meeting September 10 of the Tulsa Chamber of Commerce.

Ten-Cent Advance In One Arkansas Field Approved

WASHINGTON, D. C.—An advance of 10 cents per barrel in the ceiling price for crude produced in the Smart field, Arkansas, was authorized this week by the Office of Price Administration. The advance lifts the top price in the field to $1.18 per barrel. Purchasers in the field, OPA reported, have agreed to absorb the higher prices, thus avoiding increases to consumers.

Carter Raises Postings on Low-Gravity Crude Oil

Carter Oil Co., effective September 7, advanced postings for low-gravity Mid-Continent crude by a maximum of 10 cents per barrel. The company's new posting for 21-gravity crude and below starts at 85 cents with a 2-cent increment for each degree of gravity. Previously, the company's postings started at 75 cents with a 3-cent differential, up to 29-29.9 gravity. Postings were unchanged for 30-gravity oil and higher.

Hope Natural Gas Co. Absorbs Affiliate

CLARKSBURG, W. Va.—Hope Natural Gas Co., effective September 1, acquired by merger all properties of Hope Construction & Refining Co., Pittsburgh, Pa.

No change in management is involved. Present warehouses will be maintained. All contracts for products with Hope Construction & Refining Co. have been assumed by the Hope Natural Gas Co.

The merger was a step in the simplification of the corporate structure of the two companies which always have been affiliated.

The main Hope Construction & Refining Co. plant at Hastings, W. Va., as well as other plants in West Virginia, became property of the Hope Natural Gas Co.

DEATHS

Frank W. O'Brien, a member of Dow Chemical Co. for the past 31 years, died August 28 of a sudden heart attack at his home in Midland, Mich. At the time of his death he was a divisional superintendent for Dow and was in charge of caustic soda production.

Thomas Edward Cavanaugh, chief inspector for Calgary Gas Co., died at Calgary, Canada, recently. A native of Homestead, Pa., he had been employed by the company for 32 years.

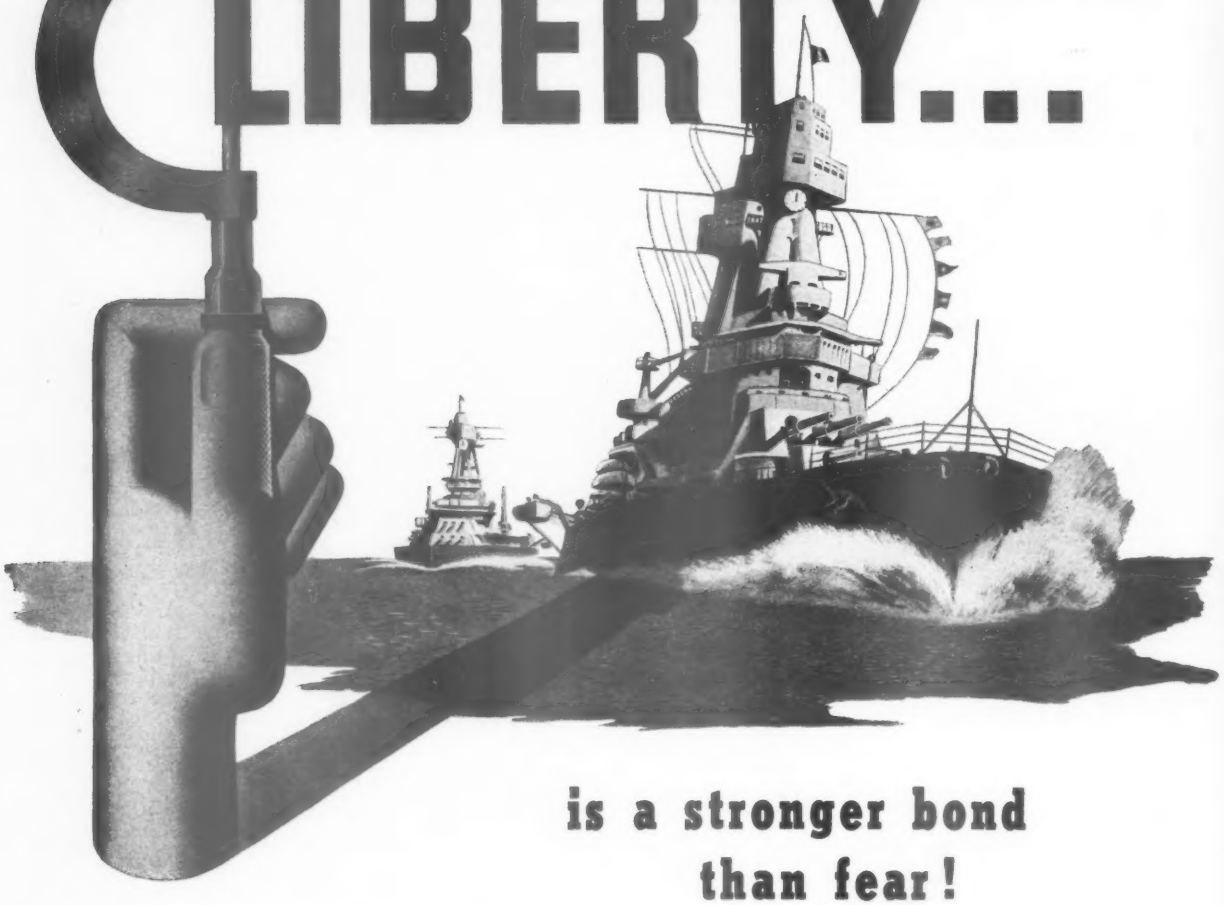
Dr. Willem A. J. M. Van Waterschoot Van Der Gracht, 70, distinguished geologist and former head of American oil companies, died in Roermond, The Netherlands. Former inspector general of state mines in The Netherlands, Dr. Van Der Gracht received an honorary degree in mining engineering from Colorado School of Mines in 1924. In 1917 he became president of Roxana Petroleum Corp., leaving that position in 1922 to become vice president of Marland Oil Co. In 1927 and 1928 he was head of the Hudson Bay Marland Oil Co. In 1928 he resigned to become a consultant.

Howard R. Auerswald, 51, assistant superintendent of production for Gulf Oil Corp., Tulsa, died after a heart attack suffered while playing golf, September 4. He had apparently been in normal health. Death occurred before he could be removed to a hospital. Mr. Auerswald had been with Gulf's production department since 1919.

Virgil B. Dobbs, 30, employed in the accounting department of Gulf Oil Corp., Houston, Tex., until he enlisted in the Navy in November, 1942, has been killed in action in the Southwest Pacific, where he was serving as a storekeeper second class.

Lloyd Seigler, 66, oil man who maintained homes in Everett, Wash., and Los Angeles, Calif., died in the latter city last week. Mr. Seigler entered the oil business during the first World War oil boom at Burkburnett, Tex., and later acquired large holdings throughout North, West and East Texas, which he operated until he retired because of ill health in 1934.

LIBERTY...



is a stronger bond than fear!

Why do the men in the armed forces of the United Nations fight with such fervor and ferocity? Why did these nations hold together and work together in spite of early defeats due to unpreparedness?

The answer is that Liberty is a stronger bond than fear. Its authority springs from the free consent of the governed, while the authority of the Axis ideology is the will of gangmen who use their usurped power to enslave the masses.

Free men have always been better fighters; they are better fighters in this war. They go into battle with an undefeatable determination to save the one possession human beings desire above all others—liberty. The initiative and resourcefulness that liberty engenders in free men is manifested in the invention, quick adaptability to new requirements, and astounding production of free enterprise here in America.

The progress of the American Oil Industry to the point of producing over sixty per cent of the oil of the world is attributable to the competitive spirit of this most individualistic of industries. We of Mission are planning still greater improvements in Mission products for post-war use by this swift advancing oil industry. Now war comes first.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

MANUFACTURERS OF:

Mission Slush Pump Valves—Mission Slush Pump Pistons—Mission Piston Rods—Mission Gland Packings—Mission Rotary Slips—Mission Swabs—Mission Plug Valves.

MISSION MANUFACTURING CO.

HUMBLE ROAD HOUSTON, TEXAS

Coring With Reverse Circulation

by Harry F. Simons

New method of obtaining cores requires practically no additional equipment, does not require additional trips in and out of hole with drill string, and delivers cores quickly

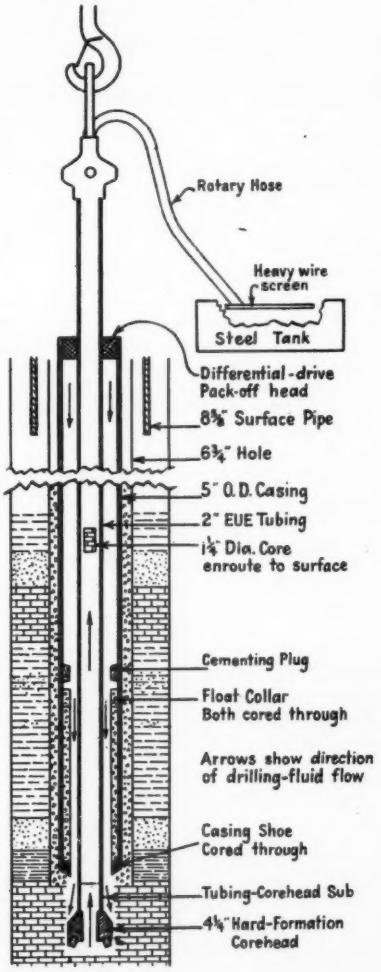
THE obtaining of adequate samples of the producing formation in an oil well being completed has long been a problem troublesome to the producing and engineering department of many oil companies. So far, the coring of the pay has been the most feasible means, although standard methods of coring add considerably to the cost of the well. Shell Oil Co., Inc., has recently developed a method of coring the pay zone with reverse circulation which is practically satisfactory and which adds nothing to the expense of the completion. In addition, cores have been obtained of some sections where conventional coring formerly did not produce results.

The new method requires practically no additional equipment, does not require any additional trips in and out of the hole with the drill string, and actually delivers the cores to the surface for examination much quicker than any present method of coring. For instance, a 1-ft. core taken of a producing section may be examined on the ground from 9 to 15 minutes after the actual cutting in wells down to 4,500 ft.

Do Not Use Core Barrel

The method devised by Shell uses a slightly remodeled hard-formation core head but does not use the inner barrel in which cores are ordinarily caught; the core catcher is also eliminated. Instead, the core is washed to the surface by the fluid stream pumped down the annulus and up through the drill string. After the core is started to the surface, drilling may proceed or not, as the engineer and geologist supervising job may direct. Sections of the core thus may come from the hole in small sections as the drilling progresses.

A complete description of the equipment used and the basic idea of reverse circulation were set forth in an article, "Slim-Hole Drilling Develops Changes in Technique," The Oil and Gas Journal, Oct. 28, 1941, page 32. The object of a reverse-circulation completion is to obtain the best possible completion at a minimum cost.



Schematic drawing showing method used by Shell Oil Co., Inc., in North Texas for completion of well with corehead instead of a bit. Cementing plug, float, collar, guide shoe and formation are all cored in a continuous operation

It has been recognized for a number of years that subjecting the producing horizon to either water or a water-base drilling fluid causes partial blocking of the passages in the formation and reduces the productivity of the well. This problem has been met by using either a low-water-loss drilling fluid or oil for a circulating medium while drilling the pay zone. When completing with oil, normal circulation (down the drill stem and up the annulus) does not provide sufficient velocity to carry the cuttings out of the hole. On the other hand, reverse circulation, which provides a high velocity for the fluid coming back to the surface, will carry out the largest cuttings and even large pieces of steel and other materials of high density.

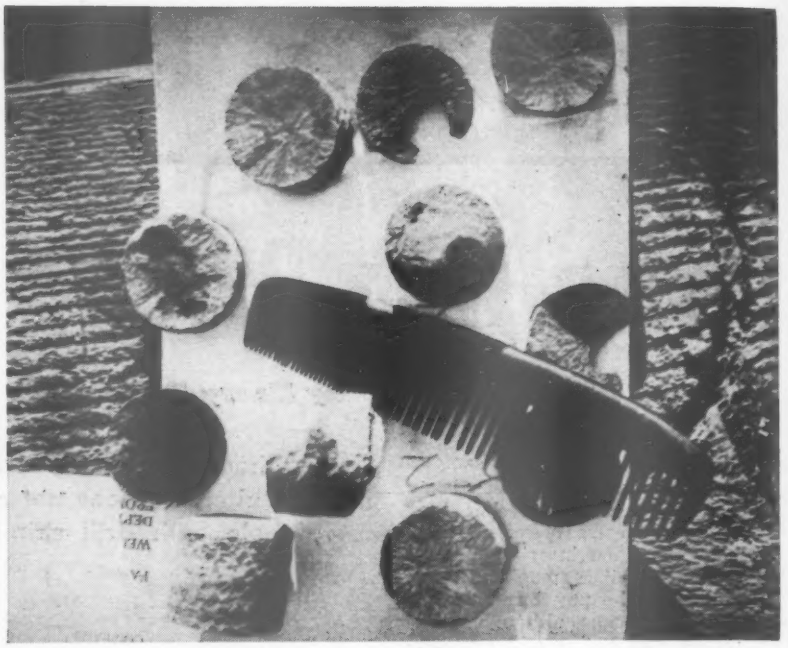
The other major difficulty at completion time is the removal of all debris from the well bore which might impede fluid passage. A much cleaner well is possible with reverse circulation than through any other medium and wells completed with oil and reverse circulation show a greater productivity than wells completed in other ways.

The time required for the completion also shows a distinct advantage in favor of the reverse-circulation method as it is no greater than drilling an equivalent amount of hole with normal circulation. Drilling the pay requires about one day while drilling the pay, shooting and cleaning out requires from three to five days.

The only limitation on reverse-circulation completions is the pressure in the pay zone or its ability to withstand the column of oil on it without appreciable loss into the formation. In some wells completed with reverse circulation, low-pressure, permeable zones which take fluid very rapidly (faster than the pump can handle the

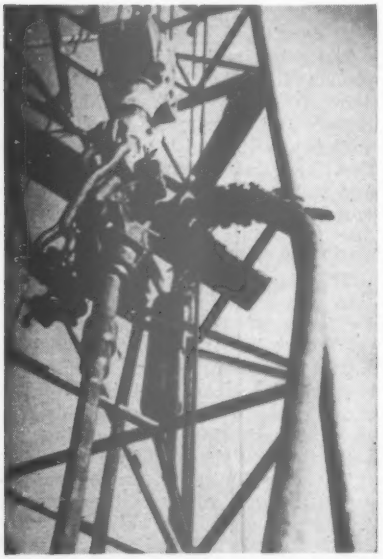
fluid) are sometimes encountered. In such cases, however, the difficulty may be overcome by the use of an oil-base mud which has excellent plastering properties and prevents entry of the drilling fluid into the formation. Use of this material makes it possible to complete wells with reverse circulation where the reservoir pressure is quite low.

The samples of the formation obtained while completing with reverse circulation are excellent compared with other samples. In addition, a gage of the well can be taken at any time simply by stopping circulation and letting the well flow. However,



Samples of cores obtained with the reverse-circulation method used by Shell. Shale, sand and lime cores are included. Pocket comb indicates size

Unremodeled corehead such as is used for coring with reverse circulation. Size of corehead can be judged by fountain pen at left



Swivel gooseneck modified to reduce curvature and thus allow passage of cores being pumped upward through the tubing during coring with reverse circulation

cores of the formation are also desired for analytical purposes.

In completing with reverse circulation, either while coring or simply drilling, the 2-in. tubing to be used for the production string in the well is employed for a drill stem. The core head is attached to the tubing by means of a special sub. A differential type pack-off head, capable of withstanding a high pressure (2,500 lb.) is used to turn the drill stem. This head may be either directly connected to the shaft normally used to turn the rotary table on a portable rig or it may be driven through V-belts or chain from a sheave or sprocket installed on this shaft.

When reverse-circulation coring was first attempted it was found that the ordinary gooseneck on the swivel made too sharp a turn to permit free passage of the cores and this was replaced with a gooseneck having a greater radius of curvature. From the swivel gooseneck to the steel tank used for a circulating pit, regular rotary-mud hose is installed.

Slim-Hole Policy

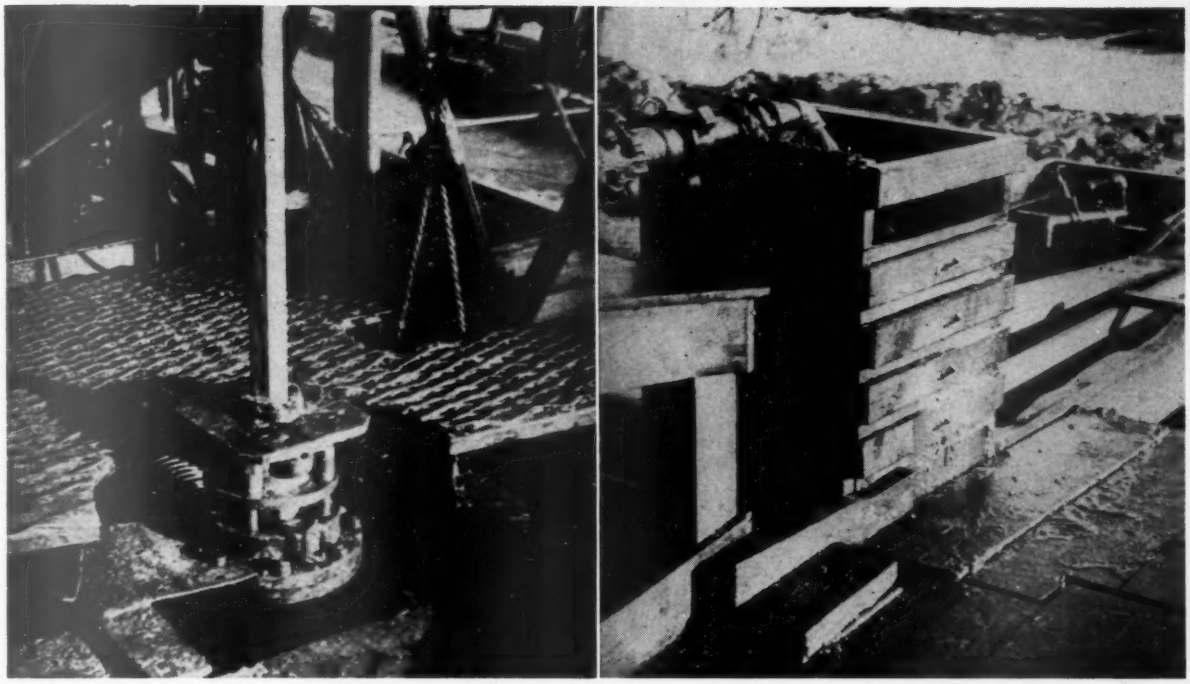
In practically all of its Mid-Continent wells, Shell follows a slim-hole policy and runs either 4½ or 5-in. pipe for a casing string to just below the top of the pay. A guide shoe is run on the bottom of the casing and a float collar one joint, or 30-ft., above the bottom. The plug used to follow the cement is pumped down until it bumps the float collar, at which point circulation is shut off.

After the cement has set three days, the tubing with the corehead (or bit) on bottom is run in the hole and with reverse circulation established, the plug, float and shoe are cored out of the pipe. The corehead used is 4½, 4¼ or 3⅞-in. depending on the size of the pay string run. The coreheads have a 1¼-in. circular opening in them.

The drilling fluid discharge coming from the open-ended hose is into a small screen box welded on the side of the circulating tank. Caught in this screen box as drilling progresses will be cores of the plug including the heavy belting fabric, the wood and the screws used for attaching the fabric to the wood, pieces of metal, a core of the plastic ball used in the float and cores of cement.

After bottom is reached, the practice is to drill ahead about 1 ft. using normal weight of about 4,000-5,000 lb. and a speed of 40 to 80 r.p.m. The drill stem is then shaken by alternating reversing and forward driving it. This breaks the bond between the core already cut and the formation and allows the core to start to the surface. Reverse circulation is maintained and no hole made for 2 or 3 min. This allows any cuttings to be washed out and also provides a break in the cuttings coming to the surface. A roughneck stands at the screen in the tank and picks up the cores as they come out of the hole. A rise in pump pressure indicates partial plugging of the tubing.

In North Central Texas, one of the areas in which reverse-circulation coring is being applied, the producing formation may be 100 or more feet in thickness with several pay zones in it.



Left: Packoff type of driving head which rotates tubing used for drill string when completing wells by reverse circulation. Right: Experimental box built by Shell engineers for catching material coming from discharge while coring with reverse circulation. Trays had bottoms with various-sized screen to catch cuttings as well as cores

The complete section is cored with one corehead and one run of the drill string. The cutting rate is only slightly less with a corehead than with a bit, the good pay sections running 5 or 6 min. to the foot while the harder lime runs 10 or 15 min.

One of the prime considerations in evaluating any coring method is the successful recovery of the core taken. While not perfect, reverse circulation does show a high recovery, running 80 to 90 per cent. Generally the producing formations in the lime and sand of North Central Texas area are quite cohesive. Drilling time will locate any streaks lost and in addition the cores coming from the well after each drilling period are measured and any missing portion of the core can be located within this 1 or 2-ft. range. How well the method would work in extremely soft formations is not known. Good cores have been obtained of highly porous lime pays which previously had never been seen or examined.

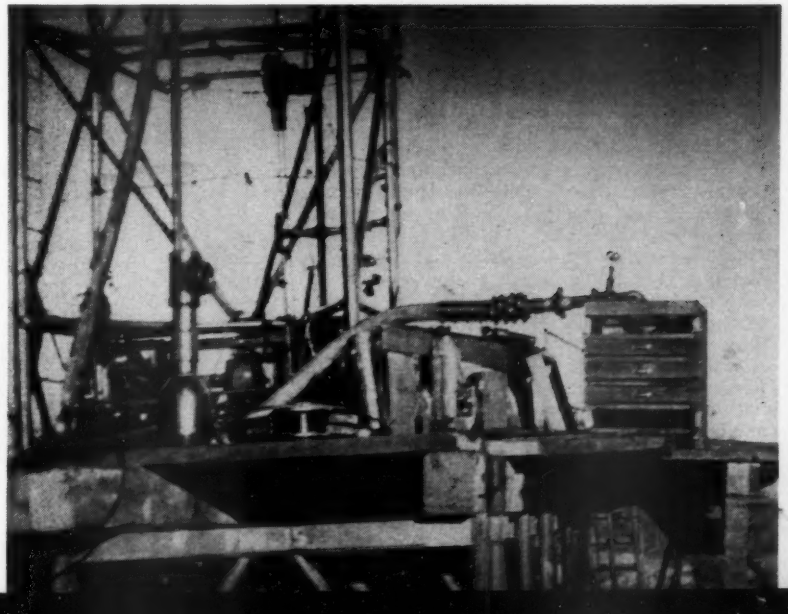
The cores are generally broken into pieces 5-in. in length or less. If the core is not broken before it leaves bottom, it is broken passing through the gooseneck. Occasionally, a core will be lodged in the gooseneck instead of coming on through but it can be quickly freed by simply alternating the direction of circulation. This moves the core in and out of the gooseneck and eventually it breaks into short enough sections to pass through. Small pieces of core, down to ½-in. can be analyzed.

One of the early difficulties in reverse-circulation coring was the development of abnormal pump pressure due to the blocking of the fluid passage by the core. The clearance between the corehead and the core is very small and very little fluid can pass through. The high pump pressures were eliminated by drilling four ⅜-in. holes adjacent to the cutters. These holes are directed upward into the water courses which connect with the tubing above. Consequently, part of the fluid by-passes the core and pump pressures are kept down.

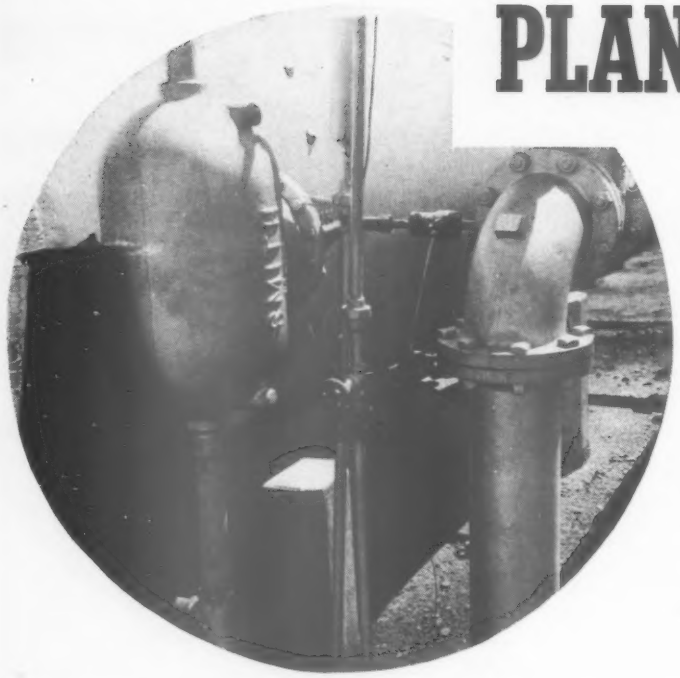
Occasionally, a core of the formation or other material will lodge in a tubing collar and cause a pressure build-up. A measuring line with a weight on it can be used to knock such obstructions loose after which they can be pumped out.

One fact which has developed, and it has considerable bearing on successful coring by standard methods, is that the length of cores can be partially controlled by regulating rotary speed and weight. Longer cores can be obtained by reducing the rate of rotation and increasing the weight applied to the corehead.

Hose discharging into screen box on reverse-circulation coring job in North Texas

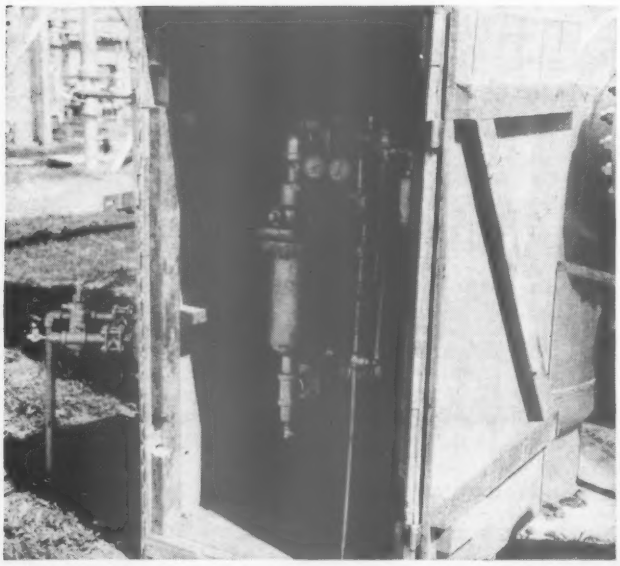


PLANT PRACTICES



Remote Control for Valve Maintaining Liquid Level

HAVING need for remote control of a diaphragm valve controlling liquid level in a surge tank, and having no air block immediately available, the operator in a Kansas plant made a substitute from a common ¼-in. gage cock. The tapered plug was removed and, with a hacksaw a shallow groove was cut lengthwise of the plug at a point which would register with the outlet port when the cock is in closed position. This arrangement allows any downstream pressure to bleed off when the cock is closed. A short piece of welding rod attached to the plug wing serves as a leverage for attaching to linkage of the kidney float. If care is taken to cut the groove in the right place, the downstream pressure will vary in proportion to the amount of opening of the cock, and thus will float the diaphragm valve, maintaining a constant liquid level.

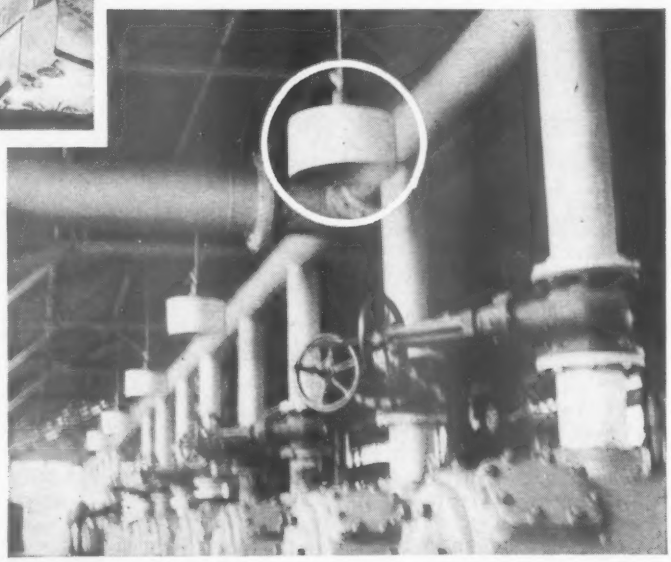


Steam Heated Sheds Prevent Freezing of Flow Regulators

AS the winter season approaches, operators of plants located in the colder climates must give attention to providing some means of protection for outside-located flow and pressure-control regulators and instruments to prevent them from "freezing" during cold spells. Operators of one Kansas plant have built small wooden houses around installations where there is danger of freezing, and in each have provided a small steam coil for heating. The coils are made from small-sized piping fastened to one wall of the house with connections to some nearby steam line serving the plant. By regulation of cocks in the inlet and outlet lines, uniform temperature can be maintained with doors of the housing closed. In warm weather the doors usually are kept open.

Glare Eliminators for Lights Of Plants in Strategic Areas

DIMMING of engine room and process lights is compulsory in certain strategic areas to prevent "sky glare." This has been accomplished in one gasoline plant in an affected area by means of simple inexpensive shrouds placed over the lights. They were made by forming "cheese box" bands of light sheet metal with the inside diameter matching the diameter of the conventional reflectors attached to the drop lights over the engines and compressors. Horizontal rays of light are prevented from passing through windows but sufficient illumination is provided to enable operators to work at night.



REACTION TEMPERATURE CONTROL *in Alkylation*

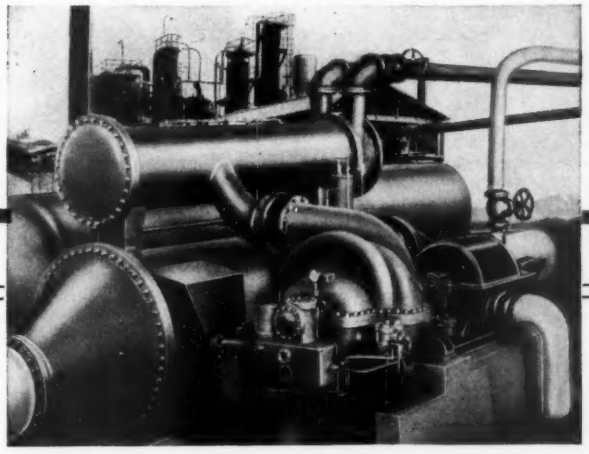
WITH WORTHINGTON REFRIGERATION

Worthington designed and supplied the Centrifugal Refrigeration units built into the Alkylation Plants whose famous names are censor-forbidden of mention here. The performance of these and other machines of the type is such as to interest every engineer who may be working on similar temperature control problems.

Worthington success in this special field is natural. It follows the combining of broad experience in Centrifugal Refrigeration with a lifelong familiarity with conditions under which refinery equipment must operate.

Add to this the fact that Worthington builds not only the Centrifugal Compressor and its auxiliary equipment, but also the Worthington-Moore Steam Turbines which, in present installations, have been the choice for direct-connected drive.

Worthington will be glad to place the details of design and operating data before interested engineers. **Worthington Pump and Machinery Corporation,** Refrigeration and Air Conditioning Division, Harrison, N. J.



CA3-40

WORTHINGTON

Refrigeration

AND AIR CONDITIONING EQUIPMENT

POUR-POINT STABILITY

Of Lubricating Oils

*by L. M. Henderson and W. G. Annable**

The storage thermal history is responsible, it appears, for some of the irregularities in pour points found in cold climates. Slow warmup of unstable pour-point oils followed by rapid chilling will show pour points 30° to 50° F. above standard A.S.T.M. pour points. With oils having cloud points above 20° F. the cooling cycle 25° F. to —25° F. failed to show unstable pour points. The cycle between 65° F. and —25° F. appears to be significant in discovering pour-point instability. A method of test for this instability is presented here in detail.

SINCE 1933 the Pure Oil Co. laboratory had known that it was possible to prepare motor oils which had all the characteristics of good winter lubricating oils with A.S.T.M. pour points of —20° F. to —30° F. but which under certain conditions would become solid at much higher temperatures.[1] In some instances, motor oils containing pour depressants might become solid at temperatures as much as 40° F. above the A.S.T.M. pour point. At that time an early form of the method described below for the determination of pour stability was used by the Pure Oil Co.

Work was continued over a period of several years to (1) determine the cause of this solidification (2) to insure that oils produced and marketed were satisfactory in storage and (3) to develop suitable test methods for the determination of what has become known as "pour stability" or freedom from solidification in storage. The information developed has been released privately to competing companies and to the military services, but has not been previously published. This eccentric behavior of certain motor oils may be due to a variety of factors such as a more general use of additives to impart or improve specific characteristics of a lubricating oil and which, in certain instances, counteract the action of a pour depressant used in conjunction with the additive or additives. Manufacturing problems and conservation of vital materials during war time make it necessary to study the effect upon the specifications of lubricating oils of such factors as the minimum amount of dewaxing required for a specification lubricating oil and the minimum amount of pour depressant required to insure fluidity of the oil down to the specified pour point under all climatic conditions. The A.S.T.M. pour point will not necessarily indicate the results to be expected under actual climatic or field conditions but the pour-stability test described below has proven useful in this respect.

This pour-stability test is time consuming and is not intended as a routine control test, for once the conditions of manufacture of the neutrals and of the blending are established it should only be carried out occasionally as a check or when it is desired to change any constituent of the blend. It is also a useful test when inventories of low-cold-test oils are built up during the hot summer months for early winter requirements. Dewaxing during hot weather is more of a problem than during cold weather, consequently there may be a tendency to substitute additional pour depressant for wax removal with a resultant adverse effect on the pour stability of the oil. The A.S.T.M. pour point may not detect this but the pour-stability test should.

It is the purpose of this paper to indicate some of the conditions which bring about irregular solidification points and deviation from A.S.T.M. pour points and to present a method of test which indicates whether or not an oil is relatively stable with respect to pour point.

*The Pure Oil Co.

Thermal History

In this investigation many samples, most of them in quart cans or dispensing bottles, were stored under field conditions. Some were stored at low but nearly constant temperatures for long periods and others at temperatures which varied each day in a cyclic manner. The oils were of the wax-bearing type, contained pour depressants and possessed viscosities comparable to winter motor oils. When subjected to a cyclic variation of temperature with a limiting range on the maximum temperature attained in the thermal cycles, some of the oils failed to flow at temperatures 30° to 40° above their A.S.T.M. pour points. When the container was held in a horizontal position for 5 seconds and no movement of the oil was evident, the oil was recorded as "solid."

Certain samples of oil (Nos. 1 and 2 of Table 1) stored in a building where the temperature of the oil dropped to —10° F. at night and rose to 40° and 50° F. during the day failed to flow at temperatures 30° to 40° F. above their A.S.T.M. pour points. These oils were subjected to a laboratory pour-stability test (described below) which involved subjecting the oil to a cyclic range of temperatures from —25° F. to 65° F. The samples showed about the same low temperature flow characteristics in the laboratory test as they did in storage. It would seem, therefore, that this laboratory method of test gives promise of providing a means for the prediction of the pour-point stability of an oil in the field.

TABLE 1

Oil No.	A.S.T.M. pour point	Laboratory pour stability slow cycle
1	—30	*S at +25° F.
2	—25	S at +10° F.

*S, "solid," i.e., the oil did not flow when container was held in a horizontal position for 5 seconds.

Influence of Quantity and Melting Point of Waxes Present in Oil Upon Pour-Point Stability

Early in our investigation of pour-point instability evidence was obtained which indicated that an oil may contain a large percentage of relatively low melting-point wax and be of good pour stability but that the same oil containing a small amount of high melting-point wax would be pour unstable. These observations were made in connection with blends of Pennsylvania oils. While in this instance the authors did not make fractional melting-point assays of the components in the waxes of the Mid-Continent oils here studied, there is a possibility that the above observations apply to these oils even though there is a much smaller amount of

TABLE 2

(1) Sample	(2) Grade	(3) Type	(4) A.S.T.M. pour	(5) Wax per cent	(6) M.P.° ext. wax	(7) Pour stability†
II-10	S.A.E. 10-W	Pa.	—30	25.6	69	Bad
II-11	S.A.E. 10-W	Pa.	—30	24.8	67	Bad
II-12	S.A.E. 10-W	Pa.	—25	19.0	75	Bad
II-13	S.A.E. 20-W	Pa.	—25	28.0	61	Good
II-14	S.A.E. 10-W	Pa.	—30	14.4	58	Good
II-15	65 vis. neutral	Pa.	+35	7.6	98	Good
II-16	180 vis. neutral	Pa.	+60	29.2	94	Bad
II-17	180 vis. neutral	Pa.	+35	24.8	59	‡Borderline
II-18	180 vis. neutral	Pa.	+30	16.2	60	Good
II-19	180 vis. neutral	Pa.	+25	11.8	68	Good
II-20	180 vis. neutral	Pa.	+15	9.8	54	Good
II-21	180 vis. neutral	Pa.	0	13.2	45	Good
II-23	100 vis. neutral	M-C	+20	6.4	85	Good
II-24	200 vis. neutral	M-C	+20	4.9	86	Good
II-25	100 vis. neutral	M-C	+20	5.7	86	Good
II-26	200 vis. neutral	M-C	+10	4.4	82	Good
II-27	100 vis. neutral	M-C	+30	5.9	84	Borderline
II-28	200 vis. neutral	M-C	+20	4.8	86	Borderline
II-29	100 vis. neutral	M-C	+20	5.5	85	Good
II-30	200 vis. neutral	M-C	+20	1.4	86	Good

°These melting points were deetrmined by the petrolatum melting-point method, that is, the temperature at which a globule of wax would melt sufficiently to fall from the bulb of a thermometer.

†For Samples II-15 to II-30, the pour stability here shown is of an S.A.E. 10-W blend containing the specified neutral and a pour depressant.

‡Samples designated as "borderline" did not always show "bad" pour stability.

wax in Mid-Continent than in Pennsylvania oils.

Several oils were examined for their total wax content by dewaxing the oil with methylethylketone to an A.S.T.M. pour point of —20° F. These data and the melting points of the total wax are shown in Table 2, Columns 5 and 6. In Column 7 of Table 2 are shown the observed pour stabilities of S.A.E. 10-W blends containing the specific neutral oil indicated. The data shown for the neutrals with respect to type, A.S.T.M. pour point, per cent of wax and melting point of the extracted wax were determined on the neutral alone.

Samples II-10 to II-14, however, are blends and the data shown for them in Table 2 represent data on the quantity of wax in the S.A.E. 10-W oil "as is," its melting point and the A.S.T.M. pour point and pour stability of the S.A.E. 10-W oil.

Apart from viscosity pours, the pour point of an oil may be attributed to the wax present in the oil even though the pour point may be influenced by the presence of pour depressants. Sample II-16 of Table 2 repeatedly gave S.A.E. 10-W laboratory blends with bad pour stabilities notwithstanding the fact that the A.S.T.M. pour point of these blends ranged between —20° F. to —30° F.

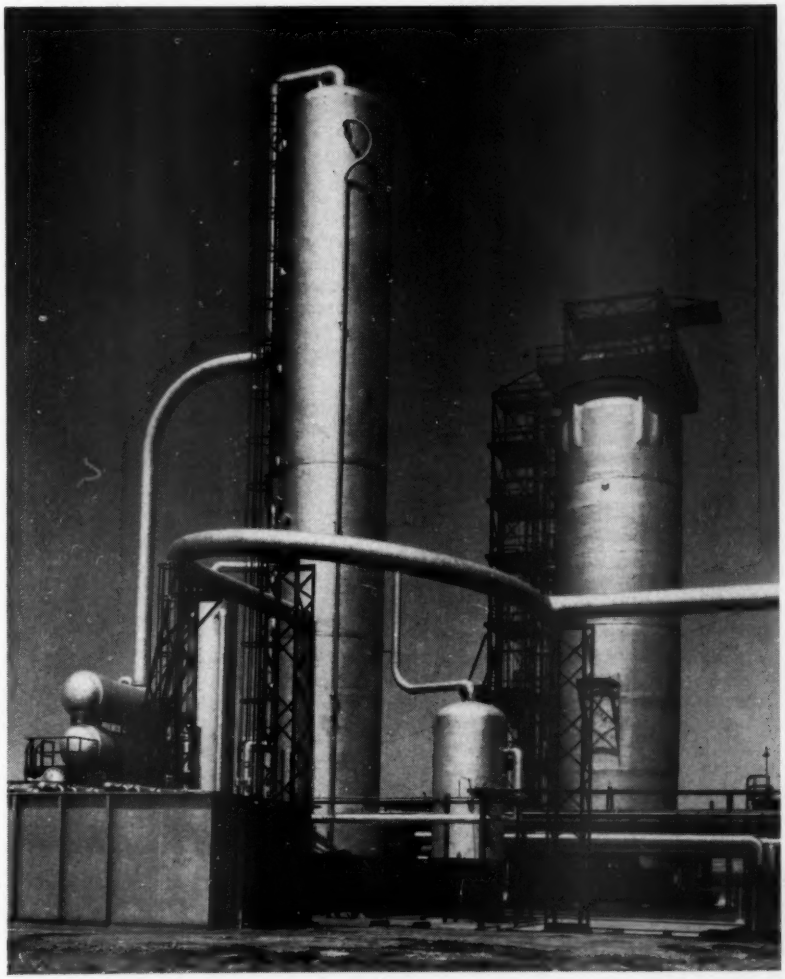
TABLE 3
Melting-Point Assay of Waxes in Oil No. II-16

Wax cut	Per cent of neutral	M. P. of wax cut
1	1.0	137
2	1.2	116
3	1.3	107
4	4.9	72
5	11.2	53
6	9.6	33

The wax-free oil had a pour point of —25° F.

with a normal amount of pour depressant present. This neutral, used in the laboratory blends, possessed a high A.S.T.M. pour point and, as shown in Table 3, contained a wide range of melting-point waxes. The oil was dewaxed to an A.S.T.M. pour point of —25° F. and the extracted wax was fractionated into cuts of different melting points as shown in Table 3.

Having established the range of melting-point waxes contained in the neutral which caused pour instability, the neutral, Sample II-16, was dewaxed to a normal 25° F. pour point and the extracted wax was fractionally crystallized from methyletylketone into three melting point cuts of 130° F., 88° F. and 55° F. In order to determine which wax fraction or fractions were responsible for the bad pour stability, laboratory S.A.E. 10-W blends were made up composed largely of the dewaxed 25° F. pour neutral and some bright stock and pour depressant. The wax fractions were



A typical atmospheric-vacuum distillation unit, by means of which lubricating-oil fractions are separated from the remainder of the crude, ready for chemical processing to make finished lubricating oils

TABLE 4

Influence of Melting Point of Wax on Pour-Point Stability

Sample	Per cent pour depressant	Per cent wax added: 130 M.P.	88 M.P.	55 M.P.	A.S.T.M. pour of blend (°F.)	Pour stability of blend, slow cycle (°F.)
IV-1	0.6	0.0	0	0	—30	Fluid at —25
IV-2	0.6	0.0	0	4	—30	Fluid at —25
IV-3	0.7	0.0	5	0	—25	Fluid at —25
IV-4	0.7	1.5	0	0	—30	Solid at —11
IV-5	0.7	0.0	5	4	—25	Fluid at —25
IV-6	0.7	1.5	5	4	10	Solid at 35

then blended into the S.A.E. 10-W oil and the results shown in Table 4 afford strong evidence that a relatively small amount of high-melting wax has an adverse effect upon the pour stability of S.A.E. 10-W blends whereas a larger quantity of lower melting point wax appears to have little or no effect.

Quantity of Pour Depressant May Influence Pour-Point Stability

In some instances, it appears that the pour-point instability is due to insufficient amounts of pour depressant in the oil. For example, an oil (Sample E in Table 5) containing 1 per cent of a pour depressant had an A.S.T.M. pour point below —30° F., but it failed to flow at —20° F. when subjected to the rapid-cycle pour-stability test described below. However, the same oil with 1.5 per cent depressant showed no lower A.S.T.M. pour point but was fluid at —20° F. as observed in the rapid-cycle test.

Type of Pour Depressant Is a Factor in Stability of Pour Point

In Table 5 the samples of oil designated by the symbols J through P differed from Sampes B to H in that they contained a different pour depressant; 2.5 per cent of pour depressant B was capable of lowering the A.S.T.M. pour point to below —30° F. but the oil was "solid" at 20° F. in the slow-cycle test whereas 1.5 to 2 per cent of pour depressant A gave a comparable A.S.T.M. pour point and good stability.

Influence of Additives

In recent years many types of additives other than pour depressants have been added to lubricating oils. In certain cases where a combination of additive and a pour depressant was present in the oil, the A.S.T.M. pour point was found not to give an adequate indication of the flow characteristics of the oil under actual storage conditions. Table 6 shows results obtained on an oil containing both an additive and a pour depressant. In this specific instance, information was desired on the pour stability of the oil down to 0° F. only; hence the observations during the pour-stability test were not made at temperatures below 0° F. except in two cases. The data in the table showing "F at 0°" simply means that the sample was "flowing" at 0° F. It may or may not flow at lower temperatures. The composition of oil samples A to F inclusive differed in percentage of pour depressant, nevertheless all were solid at 17° F. to 20° F. in the slow-cycle test even though the A.S.T.M. pour point of several of the samples was —30° F. The additive had an adverse influence on the pour stability of the oil which contained a pour depressant.

Type of Neutral

In Table 6, Sample G possessed the same viscosity as oils A to F and contained neutrals from the same crude, but it contained a different percentage and viscosity of neutral. This change rendered Sample G more stable with respect to pour point than oils A to F.

Discussion

The authors can offer no full explanation for irregular pour points. Certain observations, however, provide an interesting basis for speculation. As shown above, "storage thermal history" of wax-bearing oils appears to be responsible for most of the irregular solidification points observed with samples in storage in cold climates. Shock chilling is known to influence pour points, but in commercial storage shock chilling is not likely to occur. Daily cyclic variations in temperature, however, do occur. The authors have noted that if oils of poor pour stability are allowed to warm up from —25° F. to about 65° F. and then promptly cooled to low temperatures, the oil will solidify at temperatures 30° F. to 50° F. above their A.S.T.M. pour points. Even though these unstable samples appeared clear at 65° F. after the initial cooling, it is possible that the liquid was not homogeneous and that some segregation of submicroscopic wax nuclei and pour depressant existed with the result that when the oils were cooled after standing only an hour or less at 65° F., the pour depressant was not effective. If, however, the oil was held at 65° F. for 24 hours (or at 115° F. for a short time), the liquid apparently became homogeneous since it was observed that on subsequent cooling to a low temperature the oil remained fluid at temperatures down to its A.S.T.M. pour points. The cloud points of the blended oils investigated were below 40° F.

Some interesting information was obtained in developing cooling cycles recommended in the pour-stability test in that the cycles varying between 65° F. and —25° F. showed oils at their worst. With oils having cloud point above 20° F., cooling cycles varying between 25° F. and —25° F. failed to indicate bad pour stability. It is apparent, therefore, that oils will not necessarily exhibit erratic pour-point characteristics if left out of doors in continuous cold weather. Ex-

TABLE 5

Oil sample	Pour pressant	Per cent pour depressant	A.S.T.M. pour† (°F.)	Pour stability†: Slow cycle (°F.)	Rapid cycle (°F.)
A (blank)*	..	...	25	.....	.....
B	A	0.25	—5	.....	.....
C	A	0.50	—20	F at —25	S at —10 or higher
D	A	0.75	—20	F at —25	S at —10 or higher
E	A	1.00	B—30	F at —25	S at —20 or higher
F	A	1.50	—30	F at —25	F at —20 or lower
G	A	2.00	B—30	F at —25	F at —20 or lower
H	A	2.50	B—30	F at —25	F at —20 or lower
J	B	0.25	25	.....	.....
K	B	0.50	20	.....	.....
L	B	0.75	10	.....	.....
M	B	1.00	—20	S at +20	S at —10 or higher
N	B	1.50	—20	S at +20	S at —10 or higher
O	B	2.00	B—30	S at +20	S at —10 or higher
P	B	2.50	B—30	S at +20	S at —10 or higher

*Gravity and viscosity of blank were: A.P.I. gravity, 31; S.U. vis., 190" at 100° F
†B—30, Below minus 30° F.
F at —25° F., "Flowing" at —25° F.
S at —10° F., "Not flowing" at —10° F.

TABLE 6

Oil sample	Per cent additive	Per cent pour depressant	A.S.T.M. pour (°F.)	Pour stability: Slow cycle (°F.)	Rapid cycle (°F.)
A-O (blank)*	0.0	0.0	+15	S at +15	S at 0 or higher
A-1	0.0	1.0	B—30	F at —25	F at 0 or lower
A	2.0	0.0	—10	S at +17	S at 0 or higher
B	2.0	0.2	—25	S at +20	S at 0 or higher
C	2.0	0.4	—25	S at +20	S at 0 or higher
D	2.0	1.0	—30	S at +18	F at 0 or lower
E	2.0	1.5	—30	S at +18	F at 0 or lower
F	2.0	2.0	—30	S at +18	F at 0 or lower
G	2.0	1.5	—30	F at —10	F at 0 or lower

*A.P.I. gravity, 26.5, S.U. vis., 210" at 100° F.

posure to continued low temperatures has little or not effect on pour stability.

In developing the pour-stability tests, a number of temperature cycles and cooling rates were investigated. Unfortunately one cycle could not be worked out which would be satisfactory for the various types of lubricating oils studied. To evaluate the pour-stability characteristics of an oil, it was therefore necessary to include two tests—a slow-cycle and a rapid-cycle test. An oil must be fluid down to the specified temperature in both tests for good correlation with field storage.

A description of the methods of test follows:

Method of Test for Slow-Cycle Pour Stability

Apparatus.

A.S.T.M. pour jars.

Short thermometers calibrated in 2° F. marking 5½ in. long such as Taylor Binoc No. 21410 (—40° F. to 120° F.).

Thermos jugs, 1-gal. capacity, wide mouth.

Mechanical refrigerator maintained at —10° F.

Mechanical refrigerator maintained at —40° F.

Procedure.

The samples of the oils to be tested shall be poured at room temperature into the A.S.T.M. pour jars, filling them to the calibration lines. All jars shall be stoppered with solid corks, except that one jar of each set of jars going into the same jug shall be equipped with a cork carrying a thermometer so placed that the top of the mercury bulb shall be ⅛ in. below the upper surface of the oil.

The jars containing the samples shall then be placed in the thermos jug (or jugs) in a single row close to the wall. The jug cover shall be tightened in place and the jug then placed in the low-temperature refrigerator, which shall be maintained at —40° F. The jug shall be left in the refrigerator (preferably overnight)† until the oils have cooled to —25° F. or lower. The jug shall then be removed from the refrigerator, the samples removed from the jug and the cover replaced on the jug to keep it reasonably cold on the inside.

The jars shall be placed on the laboratory bench, several inches apart, and be permitted to warm up of their own accord to 65° ±5° F. No auxiliary heat shall be used. With a room temperature of about 75° F., approximately 1 hour shall be required for the samples to attain temperature. When warm, the samples should appear clear, not hazy.

As soon as the samples have attained 65° F. ±5° F., they shall be replaced in the thermos jug and the jug left standing on the laboratory bench for an additional 2 hours during which the temperature of the samples should fall to approximately 40° F.

The jug shall then be placed in the second refrigerator which shall be —10° F. (and shall be maintained at —10° F.). The condition of the oils shall be noted and recorded at hourly intervals until they become solid.*

The rate of cooling the oils fror 30° F. downward shall be 5° to 7° F. per hour.† Samples which have become solid shall be removed from the jug and their solidification points recorded. If any samples in the jug are still liquid at 20° F., the jug shall be transferred to the other refrigerator maintained at 40° F., and the test, observations and records continued as above at hourly intervals until the pour points of the remaining oils shall have been obtained.

In extremely warm weather it may be necessary to observe the condition of the oil every 1½ hours instead of every hour in order to maintain the desired cooling rate. The test need not be taken below —25° F. on the second cycle and oils remaining fluid down to the A.S.T.M. pour point of the sample are considered satisfactory from the standpoint of this test, but such samples must then pass the rapid-cycle test.

Method of Test for Rapid-Cycle Pour-Stability Test

Apparatus.

Pour jars, thermometers and bath as specified under A.S.T.M. pour-point-determination procedure (Method D-97).

Heavy cardboard gaskets to fit outside of pour jars snugly and having an outside diameter 1½ in. larger than outside diameter of pour jar.

Procedure.

The samples of oil to be tested shall be poured at room temperature into the pour jars until filled to the calibration marks, and corks carrying the thermometers inserted (see A.S.T.M. Method D-97). The gaskets shall be placed on the jars and the jars placed in the pour bath. Gaskets shall then be lowered around the jars to form a seal between the jars and the bath. The bath shall then be cooled as rapidly as possible to —40° F. and held at that temperature.

When the samples attain a temperature of —25° F., the pour jars shall be removed from the bath, placed on the laboratory bench and be permitted to warm up to 65° ±5° F. as in the slow-cycle test. In the meantime, the pour bath shall be allowed to warm up to approximately —30° F.

When samples have attained a temperature of 65° F., they shall be replaced in the pour bath at —30° F. When they have reached a temperature of 20° F. the bath temperature shall be rapidly lowered to —40° to —45° F. On this second cooling cycle the condition of the oil shall be noted at one temperature only as follows:

For oils with an A.S.T.M. pour point of —25° F. or lower, note condition of oil at —20° F.

For oils with an A.S.T.M. pour point above —25° F., note condition of oil at a temperature 10° F. above the A.S.T.M. pour point.

The condition of the oil shall be recorded as "fluid" or as "solid" at the specified temperature. (See A.S.T.M. D-97 for method for interpreting condition of the oil.)

Oil remaining fluid under these conditions shall be considered as satisfactory as far as this test is concerned.

*In determining the condition of the oil, the A.S.T.M. procedure (Method D-97) shall be followed; i.e., if the oil fails to flow after holding the pour jar in the horizontal position for not more than 5 seconds, it should be reported as "solid."

†In cases where results are required in a rush "shock chilling" may be substituted for the "overnight cooling of the initial cooling cycle," thus reducing the over-all testing time to approximately 18 hours.

1. Hodges and Boehm, The Oil and Gas Journal, 42, 103 (June 24, 1943) have capably discussed pour-point stability of treated oils and have proposed a method of test for pour stability not differing appreciably in principle from that used by the Pure Oil Co. The Pure Oil Laboratory has observed, however, that a cyclic cooling test is not a dependable criterion of pour-point stability unless the oil is tested with two or more cyclic rates of cooling within a specified temperature range, hence the "slow" and "rapid" cycle tests described in above paragraphs. The Pure Oil procedure requires less time and less complicated equipment than that described by Hodges and Boehm.

BOOK REVIEW

THE CHEMICAL BACKGROUND FOR ENGINE RESEARCH. Edited by R. E. Burk and Oliver Grummitt. Published by Interscience Publishers, Inc., 215 Fourth Avenue, New York, N. Y., 297 pp. $3.50.

Western Reserve University invited six distinguished scientists in the field of chemistry and closely related fields to be professors for a day. Each of these men presented two lectures. This gave him an opportunity to present a substantial view of his work. In this book, the chapters are as follows: Survey of Combustion Research, by E. F. Fiock, National Bureau of Standards, Washington, D. C.; Chemical Thermodynamics of Hydrocarbons, by Frederick D. Rossini, National Bureau of Standards, Washington; Synthetic Methods for Hydrocarbons, by Frank C. Whitmore, Pennsylvania State College; Kinetics of Flame and Combustion, by Guenther von Elbe, Carnegie Institute of Technology, Pittsburgh, Pa.; The Experimental Side of Combustion Research in Engines, by Bernard Lewis, Bureau of Mines, Pittsburgh, Pa., and Some Physiochemical Aspects of Lubrication, by O. Beeck, Shell Development Co., Emeryville, Calif.

Oil-Well Pumping Practices—No. 11

Selection of the Pump Plunger

by J. Zaba

SELECTION of the proper size of a pump plunger plays an important part in design of an efficient pumping installation since under a given set of pumping conditions the size of plunger determines both the displacement of the pump and the loads imposed on the equipment. A plunger too small may fail to exhaust the producing possibilities of a well. A plunger too large may impose excessive loads on equipment and may affect unfavorably the displacement of the pump, because of rod stretch resulting from these loads. It is apparent, therefore, that once other operating features of a pumping installation in a given well have been decided upon, there exists a certain size of plunger which will be most satisfactory from the standpoint of over-all efficiency of the installation. Theoretical consideration and field experience indicate that, particularly in case of deep wells, more production is being lost by installation of pumps which are too large than too small.

The most direct approach to the problem of selecting the proper size of plunger would be, of course, to measure the stroke of different size of plungers and the corresponding loads and production. Such a procedure, however, would be time consuming and therefore not practical. Satisfactory results can be attained by computing, with available formulas, the actual plunger stroke, under given conditions, for different size plungers, and the corresponding loads and displacements. Comparison, preferably in a graphic way,[1] of data thus secured furnishes information on the size of plunger furnishing largest production with minimum loadings.

Mathematical formulas have been developed for determining the optimum plunger size for given pumping conditions. C. J. Coberly offered[2] the following formula for plunger size for maximum production:

$$A = \frac{S_p E}{10.39 g L^2 \left(\frac{1}{a_r} + \frac{1}{a_t}\right)}$$

where

A = plunger area for maximum production, square inches.
S_p = polished-rod stroke, inches
E = modulus of elasticity
g = specific gravity of fluid lifted
d = setting depth of pump, feet
a_r = area of rods, square inches
a_t = area of tubing, square inches

The formula applies to free tubing. In case of anchored tubing

$$A = \frac{S_p E a_r}{10.39}$$

where the symbols are the same as in preceding formula.

These formulas consider only the stretch of rods and tubing as factors affecting the plunger stroke. To correct for overtravel, Coberly suggests following correction factor by which the results of the preceding formulas should be multiplied:

$$F = 1 + \frac{2.4\,(LN)^2}{100{,}000}$$

where

F = correction factor
L = length of rods in thousands of feet
N = number of strokes per minute

To determine the size of plunger which would give the minimum peak polish-rod load for given pumping conditions, including the rate of production, Emory N. Kemler presented[3] formulas derivation of which has as a starting point the generally accepted formulas for calculating peak polished-rod load.

Using Slonneger's formula for peak polished-rod load the size of plunger resulting in a minimum peak load for given conditions can be found from following equation:

$$d = \left(\frac{KQ}{210se}\right)^{1/4}$$

where

d = plunger diameter for minimum peak load
K = weight per foot of sucker rods (average weight per foot for tapered strings)
Q = rate of production
s = specific gravity of fluid pumped
e = volumetric efficiency of the pump

If Mill's formula is used:

$$d = \left(\frac{KQN}{2{,}750es}\right)^{1/4}$$

where

N = number of strokes per minute and other symbols are as in preceding formula.

Displacement

The theoretical displacement of a sucker-rod pump, that is the amount of fluid delivered per unit of time, depends, of course, on size and stroke of plunger and number of strokes per unit of time. Expressed in generally used terms of barrels per 24 hours the displacement can be found from the formula:

$$P = 0.1484 \times S \times N \times A$$

where

P = barrels per 24 hours
S = strokes in inches
N = number of strokes per minute
A = area of plunger, square inches

for any given plunger size the formula can be written:

$$P = C \times S \times N$$

where C is a constant the value of which for different sizes of plunger is shown in Table 1 and other terms are as in preceding formula.

TABLE 1
Constant C for Calculating Theoretical Displacement

Plunger diameter (in.)	Constant C
1	.116
1¼	.182
1½	.263
1¾	.358
2	.465
2¼	.590
2½	.732
2¾	.876
3	1.049
3¼	1.231
3½	1.428

If in the displacement formula the polished-rod stroke is substituted for S the result is the so-called apparent theoretical displacement. If the actual plunger stroke, as calculated or measured, is used the result is the actual theoretical displacement.

The theoretical displacement as-

NEW FIRE-KILLING POWER FOR DUGAS

DuGas, well known for its fast action in extinguishing difficult fires, now makes an important new contribution to fire protection. Research has resulted in the development of a new PLUS-FIFTY duGas Dry Chemical with increased fire-fighting effectiveness when applied from duGas pressure-type dry chemical extinguishers. This new, faster action is obtained without sacrificing any of the distinctive advantages of the former duGas.

NEW PLUS-FIFTY duGas DRY CHEMICAL

Proven by Hundreds of Practical Fire Tests

It retains the long-range effectiveness of the stream which permits the operator to knock down fire from a greater distance. It hangs in a cloud over the fire, providing greater smothering action and reducing flash-backs. Like the former duGas, PLUS-FIFTY duGas will not cake, harden, evaporate, deteriorate or freeze. It generates no toxic fumes and is not an electrical conductor. Since no critical materials are used in its production, PLUS-FIFTY duGas is available without priority for refill purposes...and there is no advance in price.

APPROVED by the Underwriters' Laboratories and the Factory Mutual Laboratories.

AVAILABLE in Models 15 and 30 Hand Extinguishers, Models 150 and 350 Wheeled Extinguishers.

. . . WRITE FOR COMPLETE BULLETIN ON NEW PLUS-FIFTY DUGAS and Priority Information on Extinguishing Equipment.

Model 150 Wheeled Extinguisher

WRITE FOR

Chart showing characteristics of *all* types of approved hand fire extinguishers.

DUGAS ENGINEERING CORPORATION
OWNED AND OPERATED BY

sumes 100 per cent efficiency of the pump. In actual practice the volumetric efficiency of a pump is dependent on a number of factors and approaches only very seldom the figure of 100 per cent.

Volumetric Efficiency

The volumetric efficiency of a sucker-rod pump may be defined as the ratio, for a certain unit of time, of fluid, actually delivered by the pump to the surface, to the theoretical displacement of the pump. The question of what constitutes a good volumetric efficiency is a relative one since in certain cases conditions beyond the control of the operator preclude attaining of a satisfactory efficiency. The range of volumetric efficiency attained most commonly in field practice is rather wide, probably anywhere from 30 to 90 per cent, but the average would be probably considerably above 50 per cent. The factors which may affect or are affecting the volumetric efficiency of a pump are many and they can be divided into four groups.

To the first group would belong characteristics of the fluid being pumped such as viscosity, temperature, amount of gas in solution, gravity of fluid, and others. The second group includes the well characteristics such as well's depth, bottom-hole pressure, productivity index. The third group includes the characteristics of design and state of repair of the pump. The fourth group consists of characteristics of pumping operations, that is, submergence of pump and characteristic of the pumping cycle, length of stroke and number of strokes per minute.

Of all these factors the gas which must be handled by the pump has the most pronounced effect on the volumetric efficiency of the pump. This effect will be the subject of a more detailed discussion in the following installment of the series. Analysis of other factors, many of which are interrelated, is given in the following:

Fluid characteristics.—The low viscosity of oil handled may reduce the efficiency of the pump by increasing the leakage past plunger, unless proper fit of the plunger to meet the conditions is provided. On the other hand, high viscosity of oil, may, under certain conditions bring about only partial filling of the barrel thus reducing the volumetric efficiency. Temperature of the pumped fluid may affect the efficiency because of its effect on viscosity of fluid or because of uneven expansion of plunger and liner in case they are made from different materials. The temperature affects also release of gas from solution. Furthermore, the heat generated by compression of gas in the pump speeds up the chemical reactions leading to corrosion, affecting the state of repair of the pump.[4] The gravity of oil affects, of course, the loads handled which has its effect on the actual plunger stroke and the actual displacement of the pump. Existence of foam conditions reduces sharply the efficiency and presence of abrasive matter in the fluid brings about the leakage past plunger and valves.

Well characteristics.—The bottom-hole pressure of a well, expressing itself in the available fluid level, has its effect on the pump efficiency because it may limit the choice of the pump submergence. If the displacement of a pump is larger than the well's ability to produce, conditions of partial filling of the barrel and of the fluid pound will result. Wells' productivity index is therefore an important factor. The well depth affects the loads, and what follows plunger travel.

Pump characteristics.—The effect of design on the efficiency of the pump is related directly to the question of gas being handled by the pump and will be discussed in conjunction with this subject. The question of leakage past plunger has been a subject of detailed tests.[5] It has been found that the leakage varies about as the cube of the fit of the plunger (Fig. 1). It is assumed to be directly proportional to the depth of pumping and to the plunger diameter and inversely proportional to the length of plunger and viscosity of oil. Leakage by even slightly worn valves may be considerable.

Pumping operation characteristics. The weight of fluid above the pump is the force, which overcomes the resistance of gas in the working barrel, causes opening of the standing valve and brings about the filling of the barrel on the upstroke. The submergence therefore, which is defined as the vertical distance, in feet, between standing valve of the pump and the working level of the well, is an important factor affecting the volumetric efficiency of the pump. The effect of submergence on the volumetric efficiency and the relationship between these two factors has been established by experiments performed nearly 20 years ago.[6] In any given pumping well, however, the question of submergence has to be considered not only from the standpoint of pump efficiency, but also from the standpoint of well and reservoir characteristics.[7] In other words, the effects of high level on ultimate recovery, rate of production, well's gas or sand conditions have to be weighed against effect of submergence on pump efficiency.

Characteristics of the pumping cycle affects the actual travel of the plunger and what follows the volumetric efficiency of the pump. They also may have a direct effect on efficiency. For instance, too fast speed of operation may not permit proper filling up of the working barrel, reducing sharply the efficiency of the pump.

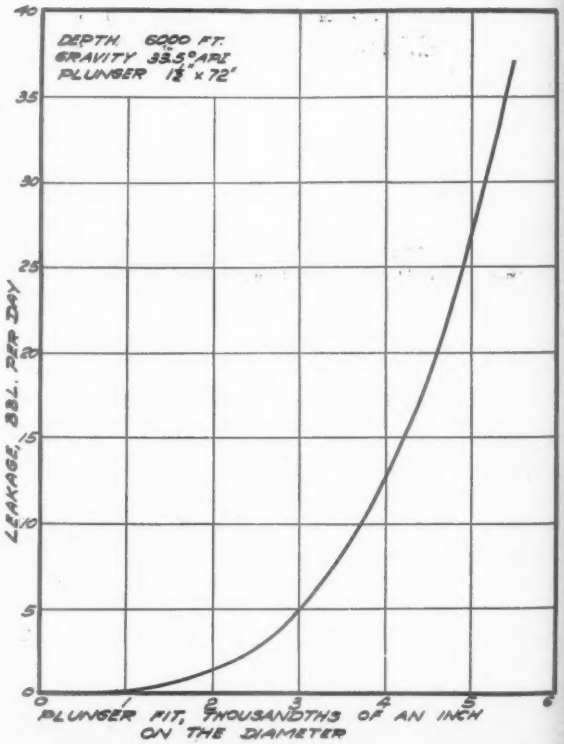
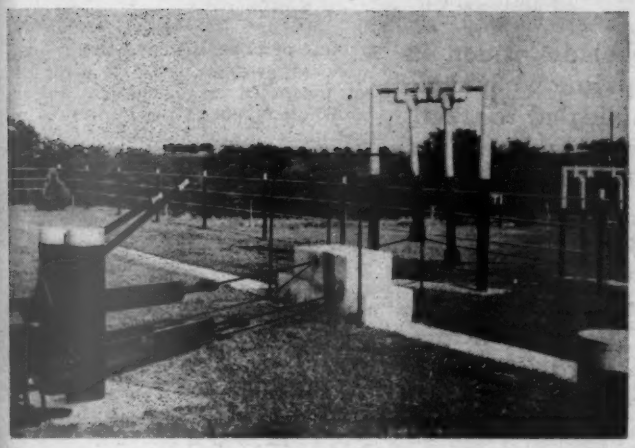


Fig. 1—Leakage past oil-well plungers (from "Economics of Pumping," A.P.I. Drilling and Production)

Bibliography

1. D. O. Johnson: "Analysis of Optimum Sucker-Rod Pumping." A paper presented before spring meeting of the petroleum division of A.I.M.E., Dallas, Tex., May 1943.
2. C. J. Coberly: "Problems of Modern Deep-Well Drilling." A paper presented before spring meeting of A.S.M.E., Los Angeles, Calif., March 1938. See also The Oil and Gas Journal, May 12, 1938, p. 126.
3. E. N. Kemler: "Selection of Pump Size for Optimum Sucker-Rod Pumping Conditions." Oil Weekly, April 28, 1941, p. 17.
4. W. E. Gilbert: "An Oil-Well Pump Dynagraph," A.P.I. Drilling and Production Practice 1936, p. 103.
5. Bruce H. Robinson: "Economics of Pumping," A.P.I. Drilling and Production Practice 1935, p. 91.
6. L. C. Uren, S. B. Sargent and V. C. Collins: "The Effect of Submergence on Oil-Well Pump Efficiency," Proc. A.P.I. 6 (Prod.) 110.
7. Huston Hoffman: "Influence of Submergence and Fluid Level on Pumping Wells," Oil Weekly, January 22, 1940, p. 16.

OPERATING IDEAS



Steps Over Rod Line

THERE is always danger of tripping and falling when stepping over a rod line so this power has its walks equipped with concrete stiles through which the rod lines run. Hand rails made from old sucker rods keep anyone using the steps from walking off the side. Knockoffs at left are the safety type with handles on the links and counterbalanced levers heavy enough to drop automatically when the well is hooked on.

Volume Tank Support

WHEN using well-head gas to operate a pumping engine some type of volume tank is necessary to provide a constant supply of fuel. Generally such tanks are set on separate supports but this operator uses a pair of hooks fastened to the tie-down bolts to hold the tank against the pumping-unit foundation. This not only eliminates the volume tank supports but places all piping close to the pumping-unit foundation and makes a neater and safer installation.

Trap for Exhaust Line

STEAM-SAVING rotary drilling rigs use the exhaust from engines and pumps to preheat the boiler feed water in the mixing pump at the right of the picture. Generally such rigs are equipped with superheaters and a high-grade steam-lubricating oil is employed. Some of this lubricant carries over into the exhaust and is carried to the mixing pump. It is undesirable for this lubricant to enter the pump and the boiler. Installation of a trap on the exhaust-gathering line just in front of the mixing pump permits removal of the lubricant at that point. A 1-in. line at the bottom of the trap allows the accumulated oil to be drawn off.

Apron for Rathole Pipe

APRONS made from ¼-in. steel plate, such as that shown around the rathole in the accompanying photo, can be quickly applied and prevent hand tools falling through the floor due to a poor fit of the boards around the pipe. The aprons are made in two pieces with small matching tabs, or ears, on each plate which allows bolting the halves together.

Cracking Technology—No. 2

Causes of Coke Formation

*by C. R. Wagner**

Carbon (coke) deposition in cracking operations is likewise a complicated reaction. The author advances the theory that coke deposition is caused by temperature and deposition of liquid on a hot surface where slow movement allows time for decomposition on the surface. Composition of the cracked gases is a function of temperature and pressure of the operation, and affected by the composition of the charge stock.

THE formation of carbon in cracking reactions is popularly supposed to be the result of successive splittings of large molecules or of such reactions as (4) above (see article in last week's Journal). As a matter of fact the formation of pure carbon is seldom encountered in commercial cracking operations. Occasionally in the cracking of gases or light gas oil vapors at low pressure and high temperature a fluffy carbon is formed which is carried on in the gas phase and which it is very difficult to scrub out. This material more nearly approaches pure carbon than does any other byproduct of the cracking reaction. Coke that separates out in furnace tubes and becomes baked on the walls may be, and probably is, dehydrogenated after deposition on the tube wall. It is known that acetylene and ethylene will decompose with the liberation of hydrogen and the formation of coke, and in both cases it is possible that the reaction proceeds by way of an exothermic polymerization. In one case witnessed by the author a gas containing about 50 mol per cent of olefins, half of which was ethylene, was being polymerized at 1,000 lb. per sq. in. and 940° F. Without warning the temperature began to climb and the operator in attempting to slow down the reaction increased the flow of gas through the coil. In less than 2 minutes the temperature rose more than 400° F. according to the recording pyrometer, and because of the lag in the instrument and the limit on the recording chart it is probable that the temperature recorded was actually much too low. A considerable quantity of carbonaceous deposit was found in the apparatus, which was promptly shut down to avoid an explosion and fire. In this case at least it seems certain that the strongly exothermic polymerization reaction produced coke by dehydrogenation of complex polymers. These polymers separated out as a liquid on the tube walls and were unable to get out of the high temperature zone in time to avoid destructive distillation, which always leaves a coke residue.

It has often been observed that coke forms in the line leading from a cracking coil to the evaporator, and the quenching patents[14 15] developed in the third decade of this century were based on the theory that this coke resulted directly from the cracking reaction. It seems much more probable that the coke was the result of a drop in temperature of the cracked vapors which permitted the formation of two phases. The liquid phase separated out on the tube walls and moved so slowly that ample time was allowed for destructive distillation of the liquid. Enough liquid was supplied by quenching to wash the tube walls thoroughly and to keep the time element low enough to prevent this destructive distillation. Confirmation of this theory is found in the fact that quenching temperatures must be lowered as pressure on the hot vapors is lowered. At 100 lb. per sq. in. the vapors may safely be handled at 700° F., but at 5 lb. per sq. in. a temperature as low as 500° to 600° F. must be used to prevent coke formation.

Point of Coking

In the early development of high temperature cracking it was found that gas-oil vapors containing a fog of liquid particles always deposited coke at the point where complete vaporization was accomplished. The trouble was overcome in the low-pressure process by the installation of "drying tubes" in the furnace at a point where heat-transfer rates were not too high. These tubes were large in diameter and would hold a sizable amount of coke before enough pressure drop was built up to shut the unit down. In the high-pressure process where vaporization and cracking took place in a continuous coil it was found necessary to charge to the coil a relatively low-boiling fraction having a color better than 2-2½ N.P.A. In this way vaporization was complete before an appreciable amount of cracking and polymerization had occurred, so there was no high-boiling material present to leave a coke residue. It seems probable that the same result could be accomplished even with darker colored charging stocks if the pressure were maintained so high that vaporization could not occur. In this way there could be no change in phase as the temperature was carried through the critical range, and there would be no opportunity for the separation of higher molecular weight material that could cling to the tube wall long enough to form coke.

Since it is necessary to fractionate the cracked products at pressures well below the critical, most cracking coils have at their outlet end a pressure-reducing valve called the "slide valve." To avoid coking in this valve it is desirable to quench on its upstream side. The amount of quench used is carefully regulated to avoid coking conditions and yet to leave enough heat in the cracked products to secure adequate separation of fuel, recycle and gasoline in the fractionating system.

Coking of Heavy Oil

Another cause of coke formation in cracking equipment which is very closely related to that just described is found in large reservoirs of hot oil. If a body of heavy oil is held at temperatures in the order of 650° to 800° F., both cracking and polymerization reactions take place so long as the temperature is maintained. The polymers produced are very heavy fuel-oil fractions which are not stable at high temperatures, and which therefore decompose when kept for some time under the conditions which caused their formation. As a result of the decomposition of these polymers there are formed compounds containing a high percentage of carbon and relatively little hydrogen; these com-

*Consultant in refining technology.

And Oil from the Barco Is Flying Them There

Oil from the far-away Barco Concession is being turned into toluene to blast the Axis out of business. From Barco oil, too, is coming high octane gasoline to deliver these bombs, via the sky route, to the proper destinations. Truly this is grand testimony to the vast resources of the oil companies serving such a vital part in winning this war.

Parkersburg lease storage tanks like this battery pictured in Colombia are safely handling fuel for victory at remote world points too many to mention. Parkersburg tanks . . . bolted steel, wrought iron, wood . . . have handled the oil for three of Uncle Sam's wars. Thanks to the quality materials and workmanship which go into these tanks, they've handled it *with care*. And, thanks to the continuous improvement in Parkersburg Tank Quality for 46 years, they'll continue to handle *with care* the oil for the peace to come.

ARMY E NAVY

We proudly fly this emblem for Excellence in War Production.

THE PARKERSBURG RIG & REEL CO.
PARKERSBURG, W. VA.

DALLAS HOUSTON TULSA LOS ANGELES
COFFEYVILLE NEW YORK

PARKERSBURG RIG AND REEL CO.

PARKERSBURG

pounds have been designated* variously as carboids, carbenes, asphaltenes, or coke. It is therefore desirable to keep hot oil moving rapidly through the various parts of a cracking unit such as the evaporator, fractionating tower and fuel flash tower. On the other hand, liquid levels should not be kept so low that thin films have an opportunity to "dry out" and produce coke.

*More often materials insoluble in hexane but soluble in CS_2 are referred to as asphaltenes, while those compounds insoluble in CCl_4 but soluble in CS_2 are designated as carbenes. Such compounds are produced by cracking reactions, but it has not been determined that they are identical with the same type of materials present in reduced crude or natural asphalt.

Regardless of the mechanism of the cracking reaction there can be no argument over the effect of cracking upon the carbon-hydrogen ratio of the resulting products. In every case no matter what the carbon-hydrogen ratio of the charging stock, the gas plus gasoline produced will contain higher percentages of hydrogen than will the charge, while the recycle stock and fuel oil will have lower percentages. Although the rate of cracking as measured by disappearance of charging stock is affected by time and temperature only and not by pressure, the character of the products is profoundly influenced by pressure as well as by temperature and time.

N·R Heat Exchangers help to stretch synthetic rubber facilities

The whole synthetic rubber program is a race against time—first in building facilities, and then in maintaining them at full output.

N·R Heat Exchangers help at both stages. New facilities and modern fabricating equipment give an advantageous delivery situation. Proper design and experienced fabricators assure the quality that keeps N·R Heat Exchangers continuously on the job.

For full details . . . write on your company letterhead

INDUSTRIAL DIVISION

THE NATIONAL RADIATOR COMPANY

221-G Central Avenue · Johnstown, Pa.

The composition of the gas produced in cracking is a function of the temperature and pressure employed and, to a less extent, of the composition of the charge. In general it may be said that the olefin content of the gas produced will rise as temperatures are increased and will decline as the pressure on the reaction zone is raised. Hydrogen content follows the same general laws.

If the radical theory discussed last week is valid, it would be expected that olefins and hydrogen in the gas would both be increased by elevating the temperature. By increasing the pressure it is to be expected that gaseous olefins would be polymerized to a considerable extent into gasoline-boiling-range material. The simultaneous disappearance of hydrogen is due to the hydrogenation of olefinic material.

Factors Affecting Gasoline Character

Early in the industrial development of cracking it was found that the character of the gasoline produced was affected by cracking conditions as well as by the character of the charge. Thus, a Burton still operating under a pressure of 95 lb. per sq. in. produced gasoline-boiling-range distillate that had a higher A.P.I. gravity when the distillate was collected at a rate of 450 gal. per hour than when it was taken off at a rate of 250 gal. per hour. The temperature on the still may have been 3° to 5° F. higher at the higher rate of distillation, but the gasoline produced by cracking remained in the high temperature zone a much shorter time and there was therefore less chance for the occurrence of cyclization and further secondary or dehydrogenation reactions. The volume of gas produced per barrel of gasoline was also less than at the slower distillation rate. By operating Burton-Clark tube stills at an overhead distillation rate of 550 gal. per hour when charging the stills with 13,500 gal. and feeding 10,500 gal. of gas oil it was possible to take off 65 per cent of distillate containing 80 per cent of gasoline.* This compares with an average yield of 50 to 55 per cent of distillate containing the same percentage of similar gasoline when taking off 250 to 300 gal. per hour of distillate.

Another advantage of the short time of residence in the cracking zone was the improved character of the distillate from the treating standpoint. Distillate which was not produced by such slow "stewing" operations was treated more easily and gave better yields on rerunning as well as less color trouble than did the regular production. Although temperature and pressure conditions were not comparable to those used in the early days, an experiment reported in 1929[16] illustrates what happens to gas-

*428° F. end point, having a 90 per cent point of 392° F.

oline fractions held at temperatures and pressures comparable to those under which they were originally produced. Table 1 gives these experimental data, which seem to confirm the view that gas is largely the result of secondary reactions and is produced at the expense of gasoline.

Fuel Oil

Fuel oil made by cracking is of course that portion of the reaction products heavier than gasoline which cannot be returned as recycle stock to the cracking unit. It is produced entirely by polymerization reactions in the cracking of gas oil or light distillates. In the cracking of topped crude a portion of the residual fuel consists of undecomposed heavy fractions of the crude. In the experiment referred to in Table 1 over half of the material reported as fuel was really a polymer having the distillation characteristics of ordinary recycle stock, while the balance was heavy fuel. Fuel oil might be defined as a salable product into which the refiner can throw those portions of the crude which cannot be converted into gasoline, kerosene or other higher priced products. To keep fuel salable the refiner must keep in mind particularly its viscosity and tendency to precipitate sediment. These properties put certain limitations on the amount of recycle that should be returned to the cracking unit, while other limitations are imposed by the chemical characteristics of the recycle stock itself.

TABLE 1

Run No.	51	91
Charging stock	Cabin Creek gas oil	426 e.p. dist.
Temperature of cracking, °F.	1,068	1,070
Gallons charged per hour	93.5	47.2
Per cent steam by weight	0.6	1.8
Per cent 430 e.p. distillate made	63.8	63.7
Per cent dry gas made	29.7	20.8
Per cent fuel (or polymers) made	6.0	15.1
Recirculation ratio	3.82	1.00
Dry gas made per hour, cu. ft.	579	781
Specific gravity of dry gas	1.050	1.041
$CO_2 + H_2S$	0.1	0.2
O_2	0.0	1.5
N_2	0.0	6.6
CO	0.1	0.3
H_2	5.8	6.3
Olefins	52.2	50.4
C_nH_{2n+2}	41.8	34.7
Value of n	1.3	1.32
A.P.I. gravity of distillate	54.9	52.0
Iodine No. of distillate	209.8	213
Distillation data on distillate:		
Initial point	100	90
10 per cent point	152	138
20 per cent point	191	165
30 per cent point	224	188
40 per cent point	258	212
50 per cent point	294	237
60 per cent point	328	266
70 per cent point	362	302
80 per cent point	396	343
90 per cent point	410	390
End point	435	436
Loss, per cent	2.9	3.7

Bibliography

14. Weaver, J. B., U. S. Patent 1601786, Oct. 5, 1926, Reissue 17,681, May 27, 1930.
15. Greenstreet, C. J., U. S. Patent 1886093, Nov. 1, 1932.
16. Osterstrom, R. C., and Wagner, C. R., Proc. Am. Petroleum Inst., 11, III, 52-59 (1930).

Compressed-Air Equipment Needs Constant Care

The equipment that goes to make up a complete compressed-air system, namely, compressors, compressed-air lines, intercoolers, aftercoolers, and receivers, needs constant care if it is to perform its duties efficiently with the minimum of maintenance and service interruption, according to the Compressed Air Institute.

Small plants, as well as large plants, need persistent attention for best operation.

In the operation of compressed-air equipment, it is important that the original installation is correctly made, that the compressors and pipe lines are properly placed with respect to each other, that lubrication is carefully carried out, that the whole unit is kept clean, protected from dust and dirt, and systematically inspected and maintained.

Yes sir! AMERICAN HEAVY DUTY ROLLER BEARINGS are made to take all you can give them—and more! Put them to the most abusive, gruelling service you can think of . . . in the heaviest, most powerful equipment built . . . and they'll carry the load smoothly and easily, with minimum maintenance for maximum periods, often outlasting the equipment itself. No wonder AMERICAN HEAVY DUTY ROLLER BEARINGS are specified by most major manufacturers and designers of oil country equipment.

Write today for complete engineering data.

AMERICAN ROLLER BEARING COMPANY
PITTSBURGH PENNSYLVANIA
Pacific Coast Office: 1718 S. Flower St., Los Angeles, Calif.

AMERICAN
Heavy-Duty ROLLER BEARINGS

QUESTIONS on TECHNOLOGY

by W. L. Nelson

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Questions should be submitted in as much detail as possible. Inquiries must be signed, but only the given initials will be printed. The source of the question is considered to be confidential. Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.

Flash Point of Kerosenes—Evaluation From Crude Oil

How can we judge the amount of kerosene that can be made from a new crude oil that we may wish to buy?—L. F.

Obviously the best way to determine the kerosene yield is to take some of the crude oil to a competent petroleum laboratory, particularly one that specializes in crude-oil evaluation, and have the kerosene made. However, it is judged that the interest in evaluating kerosene is of a more general nature, involving a consideration of many crude oils that might be purchased.

Kerosene is judged, primarily, by its flash point and by its gravity. Gravity has no very direct significance and its general importance is such that market prices are quoted on a basis of gravity. Thus, gravity must be satisfactory, but at the same time the flash point must be satisfactory. From various crude oils, the kerosenes should have gravities somewhat as follows:

	A.P.I.	
	Range	Average
Pennsylvania	45-46	45
Mid-Continent	41-44	43
N. Louisiana, Gulf Coast and Northeast Coast	41-43	42
California	38-43	..

The gravities of the various kerosenes that can be produced from a crude oil can be determined from the mid per cent gravity curve* of the crude oil.

Flash point is a much more elusive property because it is dependent on the degree of fractionation that the oil has undergone as well as the amount produced. For the case of excellent fractionation, such as that accomplished in a true boiling-point type* of distillation, the flash point of kerosenes is a reasonably well-defined function of boiling point (see Fig. 1). This figure was derived from a limited amount of data, but great consistency was exhibited. In using such a relationship, it must be constantly borne in mind that the flash points are for well-fractionated kerosenes; that smaller yields will usually result in most commercial equipments. Stated in another way, the true boiling cut points may be much higher than shown in Fig. 1 if fractionation is poor. It should also be recalled that most refiners deliberately fractionate poorly between gasoline and kerosene in order to produce a kerosene that lights easily and has proper burning characteristics.

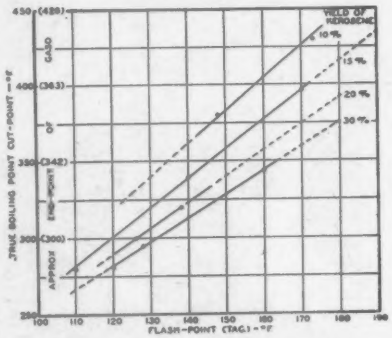


Fig. 1—Flash point as a function of T.B.P. cut point and amount of kerosene

*Nelson, W. L.—Petroleum Refinery Engineering, Chap. VII, 2nd Ed., McGraw-Hill Book Co., Inc., New York, 1941.

Surface Temperature Measurements for Better Process Control

We would like to measure the temperature in a line without opening it. Can you suggest a method?—N. L. O.

The temperature within a vessel or line is somewhat higher than at the outside surface of the equipment because of the thermal conductivity of the wall of the vessel, but fair estimates of the internal temperature can be made by measuring the temperature on the outside surface. In general, it is best to strip off any covering such as insulation before determining the surface temperature.

In a most approximate way, surface temperatures can be estimated by holding a thermometer against the surface by means of a piece of soft asbestos or cotton. For normal room temperature, the temperature recorded by the thermometer is related to the actual surface temperature approximately as follows:

Recorded, °F.	Actual, °F.
100	100
200	240
400	500
600	730
800	910

A far better method is to employ various fusion cones, etc., on the market, notably such products as Tempilstiks and Tempil Pellets. Tempilstiks are crayonlike pencils that produce a mark which melts and glistens at specific temperatures such as 125° F., 150° F., 175° F., etc., to 700° F. The Tempil Pellets are similar to the pencils except they are in the form of tablets and are used for the temperature range of 750° to 1,600° F., in 50° F. temperature intervals. These pencils and pellets are marked by color or by numbers stamped on them.

To the author of this page, it seems that such measurement methods offer an excellent means of analyzing the operation of a process or as a practical method of operational control. In most plants, an adequate number of thermocouple and thermometer wells is never available. By means of melting-point pencils, etc., it should be possible to trace the temperature gradient in a pipe still to obtain heat-exchange temperatures or to determine the heat losses through furnace walls with more ease than by other method. In fact, the possibilities for the use of such pencils and pellets appears to be enormous.

Journalog

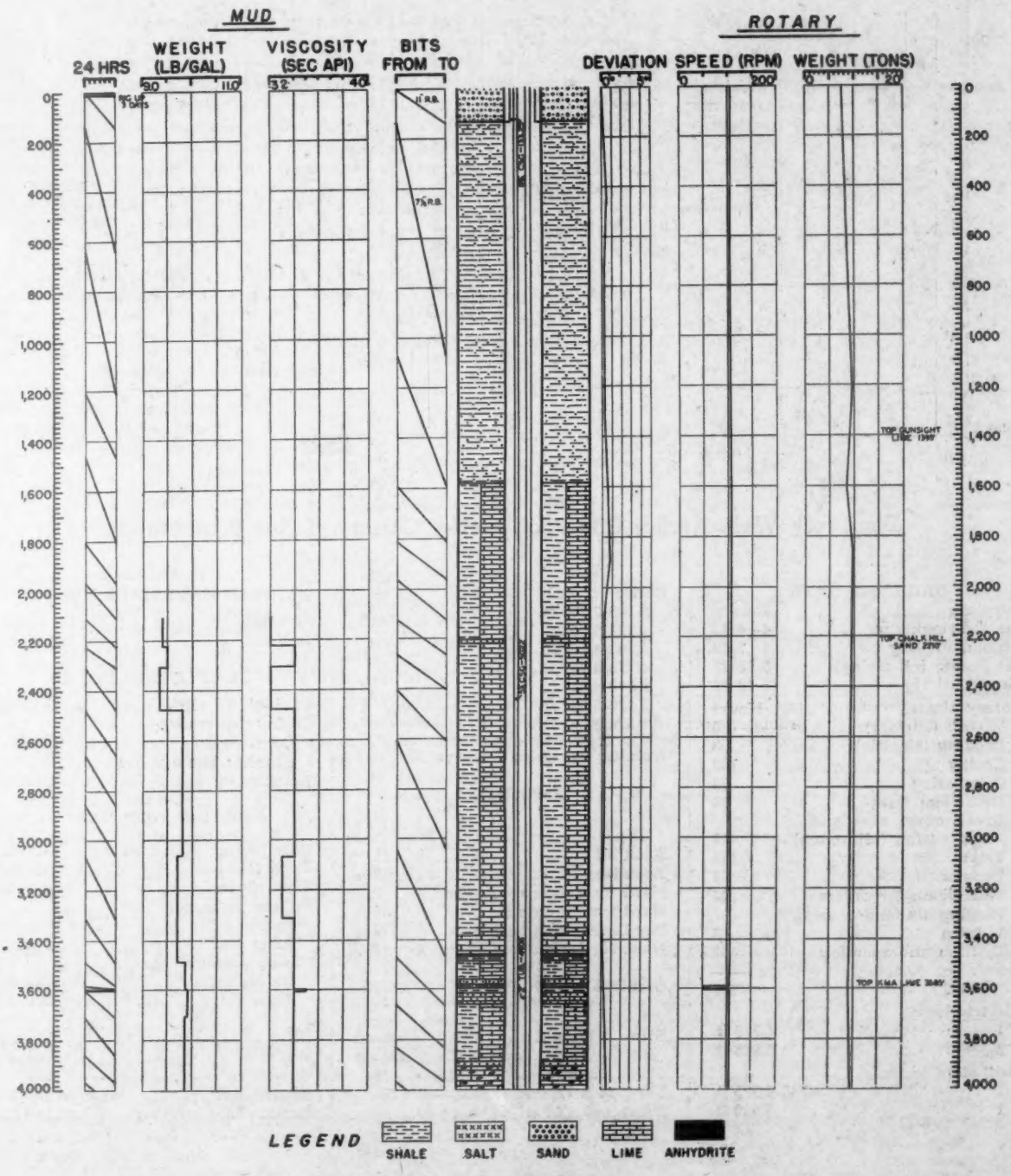
No. 37

Discovery Well, Archer City Pool, Archer County, Texas

PHILLIPS PETROLEUM CO. 1 LUKE

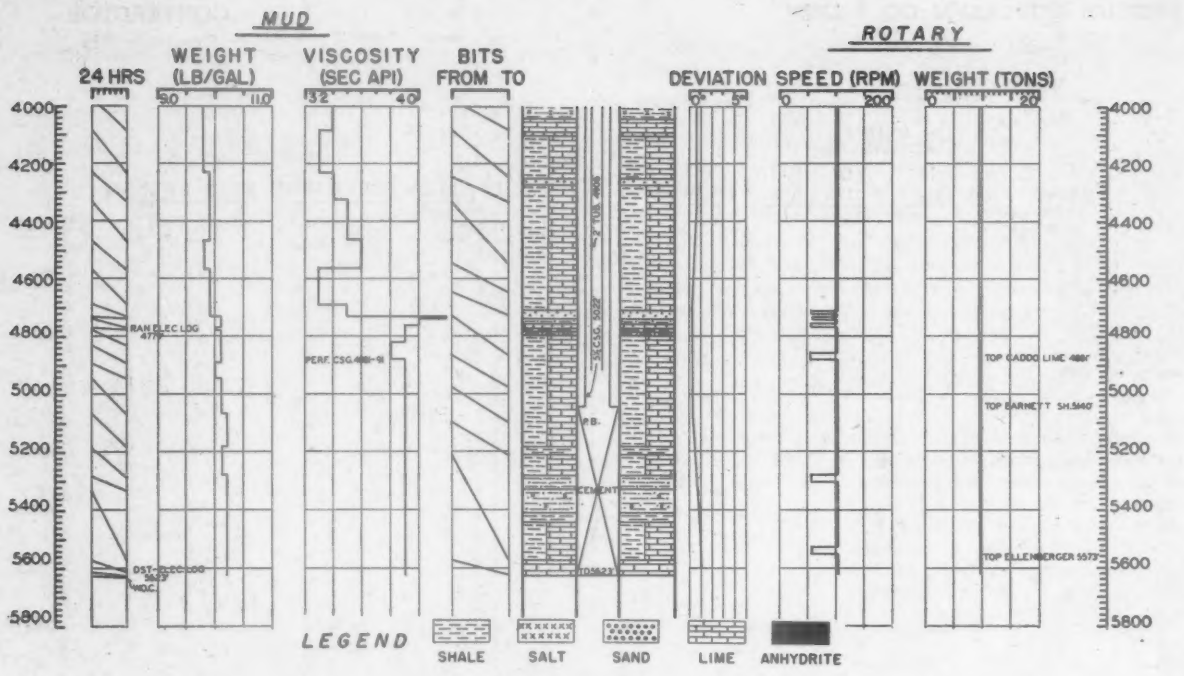
330 ft. north and west lines of NE Section 117, A.T.N.C.L. Survey, elevation 977 ft. (ground level), 985½ ft. (R.K.B.)

CONTRACTOR
Company Rig



(Continued on Next Page)

Journalog



Discovery Well, Archer City Pool, Archer County, Texas (Continued)

DRILLING DATA

Type rig	Rotary
Started rigging up	4- 4-43
Started drilling	4- 7-43
Set casing (oil string)	5-18-43
Moved off rig	5-19-43
Rotary time:	**Hours**
W.O.C. (surface)	30
Logging (electric)	8
Coring	108
Circulating	78
Drill-stem tests	60
Break down pipe and run casing (oil string)	18
Trips	158
Repairs	8
Shut down for orders	22
Rigging up and tearing down	5
Drilling and reaming	492
Total	987
Electric logs:	
1	4,779 ft.
2	5,623 ft.
Drill-stem tests:	
1	4,738-4,915 ft.
2	5,623 ft.

Cores:

3,588-3,603 ft.
4,724-4,738 ft.
4,753-4,761 ft.
4,779-4,792 ft.
4,888-4,915 ft.
5,320-5,332 ft.
5,578-5,595 ft.

Number deviation surveys 16

BITS USED

Type—	No.	Size (in.)
Rock bit	1	11
Rock bit	25	7⅞
Hard formation core head	3	7
Hard formation core head	3	6¾
Hard formation core head	4	6½
Hard formation core head	2	6¼

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Type	Depth (ft. R.K.B.)	Cement (sacks)
8⅝	24	L.W.	133.25	50
5½	14 & 17	H-40	5,022.00	195
2 (tubing)	4.7	H-40	4,906.00	...

MUD MATERIALS USED

Aquagel	126 sacks
Jellflake	250 lb.

COMPLETION DATA

Producing horizon	Caddo lime
Casing perforation:	
Depth	4,881-91 ft.
Number shots	63
Acidization	350 gal.

PRODUCTION TEST

Date of test	7-16-43
Time flowed	24 hr.
Size choke	14/64-in.
Tubing pressure:	
Before test	720 lb.
After test	530 lb.
Casing pressure:	
Before test	660 lb.
After test	260 lb.
Oil	452 bbl.
Water	None
Gas-oil ratio	250/1
Gravity oil	41.4° at 60° F.
Bottom-hole pressure	1,640 lb.

COST RECORDS INDISPENSABLE IN WELL-RECONDITIONING WORK

FOR any type of well reconditioning work, cost records must be accumulated to show profit or loss on the job. These records not only afford valuable information but serve as a basis for determining the advisability of performing similar work on other wells in the same locality.

Such cost statements customarily show the payout period and the profit or loss involved on the job. After reconditioning work has been performed, two main factors determine the amount of profit—one is the increased production of oil and the other is the increase or decrease in expense incurred in obtaining the oil. Since a multitude of factors are involved in such an analysis or estimate, usually only those jobs involving a short term payout are considered. The reconditioning work might involve cleaning out, acidizing or other remedial work, and the payout period from a general standpoint should be less than 1 year.

Calculating Increased Production

A cost analysis pertaining to a reconditioning job is summarized in Table 1. A chart showing average daily oil production by months both before and after the reconditioning work is shown in the accompanying figure.

The increase in gross production is calculated by taking the total production subsequent to reconditioning and subtracting from the estimated production which the well would have made if the reconditioning work had not been performed. The value of this increased production less royalty, taxes, and expenses, is assumed to be increased profit from the well. This assumption presupposes that the well has produced an increase amount of oil due to the reconditioning work which otherwise would not have been recovered. This may or may not be true, however, since such factors cannot be analyzed, the majority of oil operators prefer to calculate increased production due to such workover jobs, as an increase in the total amount of revenue to be realized from a well.

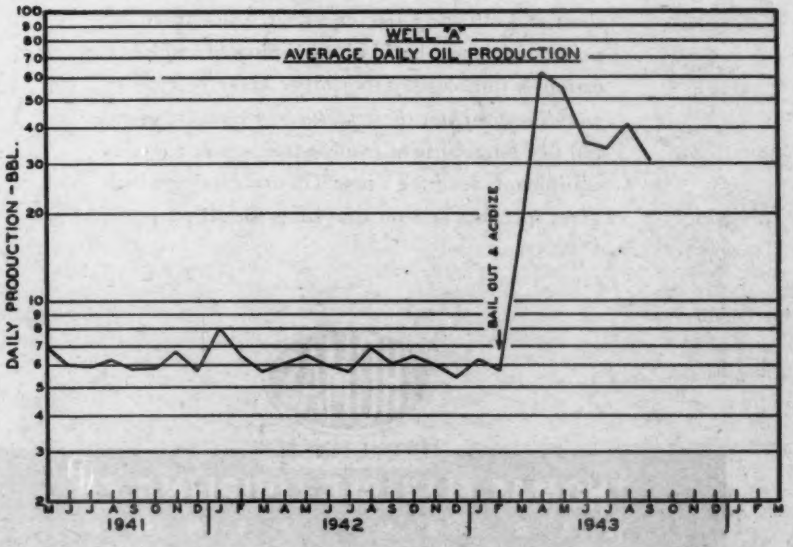
TABLE 1

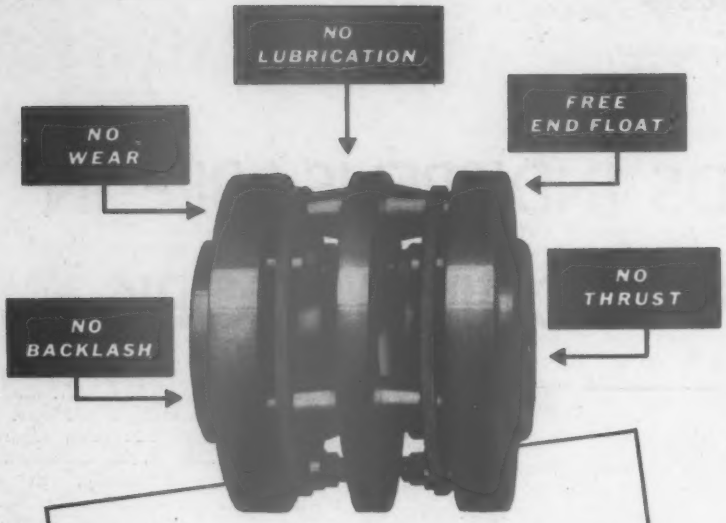
Gross production (2-1-43 to 9-1-43), bbl.	8,212
Gross production (7-1-42 to 2-1-43), bbl.	1,299
Increase in gross production from reconditioning	6,913
Increase in net production (seven-eighths of gross production), bbl.	6,049
Value of increase in net production ($1.10 per barrel)	$6,654
Less 5 per cent (gross production tax—Oklahoma)	333
Total increased revenue from reconditioning	$6,321
Expense	
Cost of reconditioning	$852
Increase in well repair expense (7 months)	470
Total expense due to reconditioning	$1,322
Net profit from reconditioning	$4,999
Payout on cost of reconditioning—days	44

Cost Analysis

In Table 1, the net production increase is the increase in gross production less one-eighth royalty. Since this cost analysis has been made for an Oklahoma well, 5 per cent gross production tax has been subtracted from the value of the increase in net production. Ordinarily, in states where the gross production tax applies, the tax is deducted by the purchaser of the crude oil from checks remitted to the producer.

All items of expense connected with the reconditioning work are then subtracted from the increased revenue. This includes both the cost of the reconditioning work and any increase in operational and repair expense which may be attributed to the job. Since, in general, an increase in the amount of fluid lifted means an increase in well repair expense, this item should be carefully considered when making an analysis. In some instances, especially where equipment has been replaced, the repair expense may show a decrease. In such instances the decrease in well repair expense should be subtracted from the cost of the job to obtain the total expense. Any increase or decrease in well repair expense is usually considered on the basis of well repair expense for a like period before the work was done.





THOMAS FLEXIBLE COUPLINGS

Make Bearings Last Longer

Thomas Flexible Couplings protect bearings from destructive cross-pull and end-thrust by overcoming parallel and angular misalignment of shaft and allowing free end float. Since there are no wearing parts, backlash is eliminated and lubrication is unnecessary. *No other make or type of coupling provides these features,* which are essential to a longer life of trouble-free service for your equipment. Send for a new Thomas catalog which gives specifications on couplings for all purposes.

THOMAS
FLEXIBLE COUPLINGS

THOMAS FLEXIBLE COUPLING CO.
WARREN • PENNA.

¾ pound of PLASTIC PROTECTION

McDonald TYPE P Safety Hat

LIGHT
STRONG
DURABLE
GOOD LOOKING
EASILY CLEANED
ADJUSTABLE TO ANY SIZE
FULLY CUSHIONED AGAINST SHOCKS

Ask for Circular

B.F. McDONALD CO.

Manufacturers and Distributors of Industrial Safety Equipment

1248-F So. Hope Street
LOS ANGELES 15, CALIF.

Offices in San Francisco and Houston

Engineering Fundamentals No. 104

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

WATER CONTENT OF CORE SAMPLES

IT has been fairly well established that practically all oil-and-gas-bearing sands contain some water, even though such sands produce no water with the oil and gas. Many writers and investigators have used the term "connate water" to denote this water content existing at the time of exploitation of an oil sand. However, this is now considered to be incorrect usage, because "connate," according to Webster's dictionary, really means "originated together"; and thus the term "connate water," if correctly applied, would refer to the water originally in the formation when it was deposited. The water content at the time of exploitation may be considerably different to the water originally present at the time of deposition, because of underground migration in the geologic periods between deposition and exploitation. More recently the term "interstitial water" has been used to denote the natural water found in the pore spaces at the time of exploitation.

It has been found that the interstitial water saturations of oil reservoirs vary over a wide range from as low as 1 or 2 per cent to more than 80 per cent of the pore space. A determination of the interstitial water saturation is very useful in order to get a measure of the space in a reservoir that is available for containing oil and gas. It is clearly evident that a sand having only 2 per cent interstitial water would have 98 per cent of its pore space filled with oil and gas; whereas, a sand with 80 per cent interstitial water content would have only 20 per cent of its pore space available for containing oil and gas. Even though the two sands have the same porosity, the acre-foot oil-and-gas content would be proportionately lower for the sand having the higher interstitial water content.

In arriving at the oil content of a reservoir it has been found easier to make the determination indirectly by measurement of the water content than by trying to measure the original oil saturation directly. Conditions that have dictated this method include the following:

1. Water from the conventional water base drilling fluid flushes the formation ahead of the bit before the core is obtained, driving out most of the oil originally present (i.e., flushing out essentially that fraction of the oil recoverable by a water-drive); whereas, the interstitial water content is probably affected only to the extent that it has added to it the water from the drilling mud that displaces the flushed oil. Use of a tracer* in the mud may make possible a quantitative measure of the amount of contamination so that a laboratory water-content test may be corrected to give the true interstitial water content.

2. Use of oil or a special oil-base mud as the rotary circulating fluid makes possible a measure of the true interstitial water content, since the oil, rather than water, from the drilling fluid contaminates the core. It is thought logical, and experience has proven, that the contaminating oil from such mud displaces no appreciable amount of water from a core taken in an oil-producing zone. Possible exceptions may occur in sands with high water saturation or high permeability. The logic of the statement that the contaminating oil displaces no water lies in the fact that since oil in migrating into the oil zone under geologic forces did not displace the interstitial water, one would not expect oil from the drilling fluid to displace the water.

In Installment 103 of this series, the retort method of water and oil saturation was described. In dealing with a core sample taken with oil-base mud, the oil content of the sample is of no practical significance and is generally not determined. In such a case an easier and more rapid method for water determination would be desirable. Several methods of water content determination of core samples have been devised, but the one described below requires as little time as any and is sufficiently accurate.

The apparatus consists of a round-bottomed pyrex flask fitted with a one-hole stopper into which is placed the side-neck of a graduated trap. A reflux condenser is fitted into another stopper at the top of the side-necked graduate by means of a close-fitting, one-hole stopper. The tip of the reflux condenser tube should be oblique and the open side should face away from the side-neck. The lowermost top of this tube should be about ⅛ in. below the bottom of the side-neck. Cold water is circulated through the jacket of the condenser. Some glass wool and calcium chloride should be placed in the top of the inner tube of the condenser to make possible the recognition of vapor losses in case heating is too rapid during the test, and to prevent entry of atmospheric moisture into the condenser while cooling.

The sample used for a determination should have been wrapped with lead foil and sealed in tins or fruit jars at the well immediately after removal from the core barrel. In the laboratory the core sample is taken from its container and a piece of suitable size is chosen for a bulk density determination using a pycnometer and mercury as described in Installment 101 of this series. About 100-125 g. of the remainder of the sample is then weighed accurately on an analytical balance and crushed to pea-size in a mortar. Care should be used during the crushing process that none of the sample is lost.

The weighed sample is then transferred to the round-bottomed flask and about 150-200 cc. of filtered water-free benzene is added to the flask. The flask is connected to the other apparatus and heat is applied. The rate of boiling should be so adjusted that the reflux from the condenser tube is about 3 to 5 drops per second. An electric heater is better than a gas burner, because of the greater fire hazard with the latter.

Water from the sand sample is thus vaporized and passes out of the flask up into the condenser along with benzene vapor. The condensate, then, drains down into the graduated trap where the water settles to the bottom, being denser than the benzene. Excess benzene overflows through the side-neck back into the flask. The distillation is continued until there is no visible increase in the volume of water in the trap during a 10 or 15-minute period. From 1½ to 2 hours of distillation may be required.

The porosity of the sample may be determined from an adjacent piece of the same core and used in calculation of the pore space of the sample placed in the flask for the water-content test described above. Then, the volume of water recovered, times 100, divided by the volume of pore space in the sample, equals the water saturation expressed as a percentage. If the core has been obtained with a water-base mud the water volume recovered in the trap must be corrected for contamination in order to obtain the true interstitial water saturation.

*The use of dextrose as a tracer is described in "Quantitative Determination of the Connate-Water Content of Oil Sands" by Pyle and Jones in the A.P.I. Drilling and Production Practice (1936) pp. 171-180.

Series prepared by Glenn M. Searns, associate professor of petroleum engineering, University of Oklahoma

SAVE POWER AND MAINTENANCE!

. . . when cooling water, gas or oil with STURTEVANT ENGINE COOLERS

Your diesel, gas, oil engine and compressor units will perform more efficiently with Sturtevant Engine Coolers on the job. Here are the design and construction features that keep Sturtevant Engine Coolers humming along year after year . . . saving power with every turn of the fan, protecting the performance of your engines, with little or no attention or maintenance:—

COOLING UNIT—Cooling Surface is the rugged, trouble-free extended surface type unit designed and built in our shop by the men who developed the *first unit engine cooler used in the oil fields.* Velocity of the cooling medium through the tubes keeps inside of tubes clean. Any foreign matter accumulates in the header and can be readily removed through clean-out plugs.

FAN UNIT—This is an efficient axial-flow fan especially designed by Sturtevant to handle the large quantities of air needed—with a minimum of power. Fan rotor is overhung, with the shaft carried on ball bearings mounted on a pedestal that also supports pump and motor when they are supplied.

CIRCULATION SYSTEM—Sturtevant units operate in a closed system. Improved cooling with rapid circulation also eliminates accumulated scale in engine jacket or pipe lines. Temperatures may be readily controlled to prevent overcooling in winter and to provide adequate cooling even in 110° summer heat.

Complete information including performance data, dimensions, and delivery schedules from your supply company or our nearest office.

B. F. STURTEVANT COMPANY
Hyde Park, Boston, Mass.

OTHER STURTEVANT PRODUCTS FOR YOUR INDUSTRY

Mechanical Draft Fans
Air Heaters
High Temperature Fans
Axiflo Pressure Fans
High Pressure Fans
Air Conditioning
Unit Heaters
Heating and Cooling Coils
Ventilating Fans
Evaporative Coolers
Wax Sweating Process

Sturtevant
REG. U.S. PAT. OFF.
Puts Air to Work

PUMPS

CENTRIFUGAL RECIPROCATING

4162

4113C

4135H

The National synthetic rubber production is expected to reach over 240,000 tons at the end of 1943.

Our pumps are on the job in several plants helping make this production possible.

Cuts are photographs of a few of the different pumps of which we have many duplicates that are operating at this time in synthetic rubber plants.

We are proud to be participating in something so vital to our war effort.

ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W TENTH ST.

● Preventing fires before they start, Justrite Safety Cans, Safety Filling Cans, and Oily Waste Cans are doubly valuable to industry today. Sturdily built to rigid safety specifications, they give you the safe, sensible method of handling and storing "flammable" fluids and oily waste. "Must" equipment for oil derricks, refineries, factories, ships, shipyards, etc. Ask for specifications and prices!

JUSTRITE MANUFACTURING COMPANY
2061 N. Southport Ave., Chicago, Illinois

JUSTRITE *Safety Products*

SAFETY CANS · FILLING CANS · OILY WASTE CANS
APPROVED SAFETY ELECTRIC LANTERNS

Natural Gas

Hope's Hugoton Pipe Line Hearing Set September 21

WASHINGTON, D. C.—Hope Natural Gas Co.'s application for a certificate of convenience and necessity to construct and operate a 22-in. natural-gas pipe line from the Hugoton field in Kansas and Oklahoma to Kanawha County, West Virginia, will be reviewed by the Federal Power Commission here September 21.

The FPC hearing, originally scheduled for August 31, was postponed 3 weeks by commission action last week, at the request of the National Coal Association, United Mine Workers of America, Brotherhood of Locomotive Engineers and other interveners in the proceeding.

The Hope company proposes to build a 1,140-mile line to augment the supply of natural gas available to its eastern distribution system.

Decision Expected Soon on 1,200-Mile Natural-Gas Line

WASHINGTON, D. C.—A decision on which of the two trunk lines proposed for the purpose of supplying Southwestern natural gas to the Appalachian region will receive Federal Power Commission approval probably will be reached before October 1. Necessity for making a decision this month between pending applications of Hope Natural Gas Co. and the Tennessee Gas and Transmission Co., was stressed by the War Production Board in its letter of August 28 to the FPC pledging priorities for one project.

"The Steel Division," J. A. Krug, program vice chairman for WPB, wrote FPC, "advised that in order to meet the necessary fabrication schedule to complete the line in time for operation during the winter of 1944-45, firm rated orders for pipe must be placed not later than October 1, 1943. We, therefore, strongly urge that the Federal Power Commission take final action in this matter prior to that date."

The WPB reached four conclusions in studying the advisability of appropriating steel for the natural-gas project. They are:

1. A new transmission line must be built, as an essential part of the war program, to augment natural gas supply into the Appalachian area.

2. The new line must be completed in time for operation during the winter of 1944-45 in order to prevent interruption in war production that would otherwise occur.

3. A program determination has been made by the War Production Board authorizing the issuance of an AA-3 priority for a line, and contemplating that materials will be made available commencing in the fourth quarter of this year.

4. Either the Tennessee or the Hope project would provide an effective means of safeguarding gas supply for the Appalachian area. Neither project has a substantial advantage over the other in terms of materials, equipment, deliverability or any other factor which the War Production Board has responsibility to appraise.

Production Rates Set In Four Texas Fields

AUSTIN, Tex.—Production schedules for Texas' largest gas fields in September were established here last week by the Railroad Commission.

Fields for which allowable production rates were fixed included: Carthage, 28,001,544 cu. ft. daily; Agua Dulce field, Dabney sand, 25,000,000 cu. ft.; Rodessa field, 34,603,800 cu. ft., and the West Panhandle sour-gas area, 630,831,000 cu. ft. daily.

Gas Divestment Plan Filed by Jersey Company

PHILADELPHIA, Pa.—A plan for divestment of all Standard Oil Co. (New Jersey) interest in five natural-gas subsidiaries whose securities have a total par value of $86,059,300 was filed here last week with the Securities Exchange Commission.

The plan, contemplating divestment by December 15, or before the year ends, followed Standard of New Jersey's registration on August 13 as a holding company. The SEC had denied the company exemption under the Holding Company Act.

Subsidiary companies involved are Hope Natural Gas Co., East Ohio Gas Co., Peoples Natural Gas Co., River Gas Co., and the New York State Natural Gas Co. The New York State company, a natural-gas pipe line and transporting concern selling gas at wholesale, was included, Standard's spokesman said, because of its "close operating relationship" with Peoples.

The plan provides that Standard first turn over to the Consolidated Natural Gas Co., which Standard created, all stocks of the five companies in exchange for 2,728,359 shares of Consolidated capital stock, which has a $15 par value.

Standard then will distribute the Consolidated common to its stockholders at the rate of one share of Consolidated for every 10 shares of Standard common. No fractional shares or script for fractional shares would be issued. Cash would be paid to Standard stockholders entitled to fractional remunerations.

Cities Service Granted Extension on Rate Schedules

DENVER, Colo.—The Tenth Circuit Court of Appeals on August 28 granted Cities Service Gas Co., Bartlesville, Okla., a 60-day extension from September 1 in which to file lowered gas-rate schedules ordered by the Federal Power Commission.

The stay, until October 29, was granted on motion of the firm's Denver representative, Donald C. McCreary, attorney, to allow more time for filing new schedules.

The FPC ordered the company last July 28 to reduce its rates by not less than $4,445,000, or about 33⅓ per cent, per year below the rates for 1941 on sales of natural gas in intrastate commerce.

Phillips to Build New Furnace-Black Plant

BORGER, Tex.—Construction of a furnace-black plant for production of a new type black was announced last week by Phillips Petroleum Co., as a phase of its over-all synthetic-rubber program.

The new plant, which will produce approximately 22,000,000 lb. of black per year, is to be in operation by end of 1943.

Cabot Building Another Black Plant in Louisiana

A new plant for the production of furnace black, closely duplicating one placed in operation last April at Guymon, Okla., is under construction by Cabot Carbon Co. at Ville Platte, La. The Guymon plant has daily production capacity of 80,000 to 100,000 lb., approximately the same as that being provided in the Louisiana installation.

First CHOICE IN ANCHORS

EVERSTICK

For dependable anchoring under all conditions, use Eversticks. Made of tough, rust-resistant, malleable iron . . . quick and easy to install . . . expand in undisturbed earth. Preferred by engineers and crews alike. Write for latest Everstick bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

NATIONAL AIROIL
OIL and GAS
BURNING EQUIPMENT

Serving the Petroleum-Chemical Industry for over 30 Years

For Details, write

NATIONAL AIROIL BURNER COMPANY, INC.
1236 E. Sedgley Avenue
PHILADELPHIA 34, PENNA.

FRASER-BRACE
ENGINEERING CO., INC.

Design, construction and installation of complete plants and projects.

Mechanical, Heavy Industries, Shipbuilding, Hydro-Electric Developments, Power Plants, Chemical and Refining Plants, Process Industries, Metallurgical Developments and Processes, Explosives, Plastics, Water Supply and Treatment, Sewage and Industrial Wastes Treatment.

REPORTS—APPRAISALS
CONSULTING

10 East 40th Street New York, 16, N. Y.

REFINING

Coastal Refineries Return to Normalcy

HOUSTON, Tex.—Refinery operations in the Gulf Coast district, hampered to some extent during most of August by water and hurricane damage suffered July 27, have been restored virtually to normal, it was reported here this week. Army authorities prevented full disclosure of the storm damage at the time the hurricane hit the Gulf Coast but this restriction now has been withdrawn.

Shell Oil Co., Inc.'s, plant at Deer Park was one of the most severely damaged. The main cooling tower, 50 feet high and weighing nearly 1,500,000 lb. was completely demolished, causing failure of the plant's generating system and interfering with steam production and processing operations.

The Sinclair Refining Co. plant at Sinco reported the loss of a small cooling tower and a section of a larger tower. Two days after the storm the Sinco plant again was in operation.

The Texas Co. refinery at Galena had some damage.

The Republic Oil Refining Co. plant at Texas City lost three cooling towers but resorted to the plant's spray pond for cooling and has been operating at around 98 per cent normal capacity after only 5 days interruption. Officials expect full normal operations by September 18. Some storage tank and electrical damage was inflicted on the plant's setup.

The Pan American Refining Co.'s plant at Texas City, adjacent to the Republic Refinery, suffered comparatively slight damage. Only one unit

Sketches of Plant Operators

PHILIP E. FOSTER, recently appointed manager of Shell Oil Co., Inc.'s Houston, Tex., refinery, has more than 27 years of plant experience to his credit. His position as superintendent of the company's refinery at Norco, La., is being filled by promotion of W. B. Stewart.

Mr. Foster started his career with Shell as a loader at the Martinez refinery loading rack on May 31, 1916, and worked up to receiver house man and fireman on the Trumble stills. In January 1917 he transferred to the refinery at Cushing, Okla., and worked as a pipefitter helper in construction of the plant and when operations started he became a stillman in the Trumble plant. He left Cushing in August 1917 and went to work as a clerk in the technological department of the main office then in Tulsa.

In June 1918, he was sent to Wood River refinery as head stillman on the Trumble plant and remained there until August 1923, when he left the country to go to a small refinery in England.

He returned to the Shell company in January 1924 and had a 6-month assignment at Norco followed by a transfer back to Wood River as second assistant superintendent. He held this position until October 1928, when

P. E. FOSTER

he was sent further up the ladder with the superintendent's post at the old Arkansas City plant. Two months later he was transferred to the Norco refinery as superintendent, where he remained until the present time with the exception of a 6-month period in 1929 when he was on special assignment in Balik-Papen, Borneo.

was damaged and two motors drowned out.

Pan American officials say that they received word of the storm so late that they were afraid to release their employes for the dash home and continued operations throughout the storm. But 4 day's delay were experienced before the plant was operating at normal again.

It is understood that the Houston works are back again on practically normal operations.

The Gulf Coast Refiners Association embracing 11 nonintegrated plants not in operation at the time of the hurricane, reported normal conditions.

"The storm damage to our 10 plants was nominal," said a spokesman for the association, "with interruptions but slight."

In the Neches Basin area (Beaumont-Port Arthur) the refineries suffured little damage from wind, but had high water to contend with. Operations were quickly restored to normal.

The entire Baytown refinery of Humble Oil and Refining Co. was shut down after July 27. The hurricane caused considerable damage, including the complete demolition of three cooling towers and the loss of power and telephone lines which stopped all power-driven pumping equipment.

Through the ingenious improvisation of temporary facilities it was possible to initiate operations by the beginning of the following week at about 60 per cent capacity and by the middle of the week crude runs had been restored to schedule for August. By rushing construction of other facilities it was possible to process during August 4 per cent more crude than originally scheduled.

Through the ingenuity of the technical and operating forces and cooperation of all employes, an official stated, it was possible almost entirely to offset the effects of reduced operations due to the hurricane.

Maximum Diesel Recovery Ordered in California

WASHINGTON, D. C.—Pacific Coast refiners of diesel-fuel oil have been ordered through Petroleum Directive 71 to process all petroleum distillate cuts to obtain the maximum yield of diesel oil of 40 cetane number or higher, and to sell this only to the military, unless given a special exemption by the District 5 office of the Petroleum Administration for War.

The directive becomes effective September 13. Prohibitions do not apply to material in transit on the effective date of the order.

Refiners are prohibited from using distillate containing 40 cetane diesel fuel for the production of an inferior product or in the manufacture of other nonmilitary products until full recovery of the desirable fraction has been accomplished.

Residual-Fuel Ceiling Raised in Montana

WASHINGTON, D. C. — Ceiling prices of residual fuel oil in eastern Montana were increased 2 to 5 cents per barrel by the Office of Price Administration, effective September 8.

This increase is granted to relieve refiners in that area from hardship resulting from the existing price structure and to permit them to receive prices sufficient to compensate them for an increase granted in February 1943 or 15 cents per barrel in the ceilings of Wyoming black crude oil, which is the base stock used for refining eastern Montana residual fuel oil.

The increase provided in Amendment 125 to Revised Price Schedule 88 will enable refiners in eastern Montana to obtain substantially the same indicated net margin per barrel as they received during 1941 and will help to ensure continued production of residual fuel oil there, OPA said.

The new ceilings for eastern Montana refineries, and comparison with the former levels, follow:

Gravity—	Per barrel— New ceilings	Old ceilings
9.9 and below	.80	.75
10 to 12.9	.85	.80
13 to 15.9	.99	.95
16 to 19.9	1.13	1.10
20 to 24.9	1.27	1.25
25 and above	1.34	1.32

Quality of Motor Fuel Slumps From War's Impact

WASHINGTON, D. C. — Gasoline sold in the United States last winter decreased only slightly in quality under the impact of wartime conditions, according to a Bureau of Mines report submitted last week to Secretary of the Interior Harold L. Ickes based upon a survey of commercial motor fuels from more than 1,100 service stations and 88 oil companies throughout the nation.

In the first checkup in nearly 2 years, the average premium-priced gasoline had declined from 80.2 to 79.6 octane number, results of the 1942-43 winter survey revealed. Regular gasoline decreased from 74.4 octane to 72.5, or 1.9 units, while the rating on third-grade gasoline dropped 2.5 units from 65.6 to 63.1 octane number.

The survey reports, inaugurated in 1936, are published semiannually in cooperation with the Cooperative Fuel Research Committee, jointly representing the Society of Automotive Engineers, the American Petroleum Institute, the Automobile Manufacturers Association, and the National Bureau of Standards.

NITROSE

NITROSE is a corrosion resisting application for metal surfaces—it is not to be confused with so-called "protective paints." NITROSE welds itself to surfaces to which it is applied, forming a bond which will not chip, crack or peel; expands and contracts with the surface covered, effectively resisting corrosive action of water, acid fumes, alkalis, brine and high temperatures.

NITROSE can be applied over wet, rusty or greasy surfaces, no sand blasting required, merely wire brush loose scale and apply.

NITROSE is not a new product; it has been used by many industries continuously for twenty years.

Please send for copy of interesting "Fact Book," regarding NITROSE.

THE EDWARD SOPH CO.
CORROSION RESISTING EQUIPMENT

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

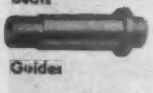
CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

THE INDUSTRY'S BEST

Thompson -VALVES -VALVE SEATS -GUIDES

Valves

Seats



Guides

...Fercrome L. Alloy Steel, used in Thompson Valves, is precision manufactured from heat-resisting alloys... thus keeping overhaul cost down.

—★—

Thompson's specialization in highest quality, large size valves, seats and guides is your assurance of lower maintenance costs and longer operating life. Details on request.

Thompson Products, Inc.

PIPE LINES

WEP Pushes Construction On South End of 20-in. Line

All of the pipe had been shipped from the mill and was on its way to locations at the end of the last week for the Beaumont, Tex.—Norris City, Ill., leg, known as the south end of the 20-in. Beaumont-East Coast 20-in. refined-products line. To supply sufficient pipe to the south end under conditions existing last month, it was necessary to divert pipe which would normally have gone to gangs on the northern leg. As a result, northern gangs were idle for a week.

Only 86 miles remained to be laid on the south end of the 20-in. line near the end of last week and it is believed that pipe for this part of the refined-products system will all be laid by the end of September. Last week's reports show that 1,056 miles of pipe have been laid for the main line and feeder lines of the refined-products project.

All of the products feeder lines to Baytown, Tex., have been finished; a Port Arthur-Beaumont line is being laid.

River crossing work recently completed for the products line includes laying of a 20-in. line across the Arkansas, Red and Ouchita rivers. Some dredging remains to be done to place the pipe in the proper position at the desired depth. Work is being done to lay a second 20-in. line across the Red River.

All lines to refineries in the Philadelphia area have been finished and put in operation for the WEP Longview, Tex.-East Coast crude-oil system. On the New Jersey lateral of the crude-oil system a line is being laid along a difficult route through the streets of Bayonne, N. J.; the line across Newark Bay was finished last month.

Tank car movements from Norris City, Ill., eastfard were impeded last week by disruption of traffic due to a railroad wreck.

However, deliveries via the pipe line reached a peak early last week of 406,000 bbl. daily including 212,000 bbl. from Norris City via tank car; 37,000 bbl. to pipe-line connections at Enfield, Ill., and 157,000 bbl. through the full length of the line to Philadelphia. Deliveries to the Philadelphia refining district later reached 165,000 bbl. per day.

Total shipments to the East Coast in the last week of August reached a daily average of 1,634,514 bbl. which is comparable to the prewar Gulf-to-North Atlantic shipments via tanker. The problem now is ceasing to be one of transportation and is becoming one of obtaining supplies.

Empire Pipeline Will Operate Sour Lake-Lake Charles Line

Empire Pipeline Co., Bartlesville, Okla., will operate the new 67-mile 12-in. crude-oil pipe line which has been under construction this summer from Sour Lake, Tex., to the Cities Service Oil Co. refinery at Lake Charles, La.

Texas-Virginia System Proposed by Congressmen

A so-called "Victory oil line," from Southwest Texas to Norfolk, Va., will be proposed by a group of congressional leaders following the current recess, according to Frank W. Boykin, Democrat, Alabama.

Taking the position that the Southeast has been "virtually bypassed" in the Government's pipe-line transportation program, a group of southern congressmen will propose the 1,400-mile project with two parallel 12¾-in. lines with spurs extending to principal Gulf and Atlantic ports. Texas, Louisiana, Arkansas and Mississippi would feed the lines.

The victory system is designed to provide intermediate terminals at Mobile, Ala.; Brunswick and Savannah, Ga.; Charleston, S. C., and Wilmington, Morehead City and Elizabeth City, N. C.

Several congressmen are carrying on a campaign over the radio in the southern states for the proposed system.

Jones & Brooks Will Relay Line for Cities Service

Cities Service Gas Co. has just awarded a contract to Jones & Brooks to reclaim and relay a 35-mile 12-in. line from the Tallant compressor station to Drumright, Okla. After the pipe has passed through reclamation operations it will be laid in a line from Tallant to Shidler, Okla.

Jones & Brooks are now located in

new offices in the Mercantile Bank Building, Dallas, Tex., having moved there from Oklahoma City, Okla., their previous location.

Sohio Lays Its First Pipe Line in Kansas

As part of its program for becoming a factor in producing, purchasing and shipping in the State of Kansas, Sohio Corp. is building an 8-mile 4-in. line from the Morrell pool, Graham County, Kansas, where it has acquired producing properties of Nate Appleman, to Union Pacific Railroad tracks at Palco, Kans. At present all oil from the area has been purchased by various interests and shipped by truck.

Magnolia's West Texas Project Awaits WPB Action

MIDLAND, Tex. — Magnolia Pipe Line Co.'s project for the construction of 335 miles of 12-in. to parallel the company's existing line between Midland and Corsicana, Tex., is reported to be still waiting for approval from WPB in order that authorization for steel for new pipe may be had. In connection with the undertaking, two loops totaling 46 miles of 8-in. between Midland and Seminole, Tex., will be laid. It is estimated that the program will cost $5,900,000.

Pure Has Booster Station On Cumberland Outlet

Pure Transportation Co. has recently put into operation a booster station located 3 miles from Bromide, Okla., on the 58-mile 6-in. crude-oil line from the Cumberland field, Oklahoma, to Seminole, Okla., which is equipped with two 250-hp. electric motors driving centrifugal pumps. The two pumping units were originally installed near Midland, Mich., for the company's pipe-line operations in that area. Later they were installed for a period at the Southeastern Pipe Line Co. station at Americus, Ga.

Until the installation of the new station at Bromide, the two gas-engine-driven reciprocating pumps at Cumberland were pumping 555 to 570 bbl. per hour at pressures ranging from 950 to 1,050 lb. With the new station it is possible to operate the initial station with discharge pressures between 750 and 800 lb.

White Eagle Extends System to Hunter Pool

Socony-Vacuum Oil Co. (White Eagle division) is providing an outlet for the Hunter pool, Saline County, by laying a 6-mile 4-in. line to connect with its system at the Roxbury pool, McPherson County, Kansas. The company has been buying all of the oil in the Hunter pool and trucking it.

Anderson-Prichard Revamps Cement Gathering System

To provide for moving the increased production from the West Cement pool extension in Oklahoma, the Anderson-Prichard pipe-line system is laying larger pipe for a part of the gathering line in the area.

Valvoline Lines Valued At $1,985,000

Value of the property of the pipe-line department of the Valvoline Oil Co. has been established at $1,985,000 for rate-making purposes as of December 31, 1939, the Interstate Commerce Commission reported today. The commission reported the value for rate-making purposes of the property owned or used by the pipe-line carrier as follows:

Classification—	Final value
Owned and used	$1,950,000
Owned but not used, but of service	35,000
Used but not owned, leased from private parties	5,425
Total owned	$1,985,000
Total used	$1,955,425

Cut and Bevel Pipe the FAST and ECONOMICAL way

The H & M Pipe Cutting and Beveling Machine cuts any size pipe with speed, economy and accuracy.

SPEED: Complete cut and bevel can be made on 12 inch pipe in about 2 minutes.

ECONOMY: Save approximately one-half labor and gas costs.

PORTABILITY: Can easily be carried from one pipe section to another.

Write for Literature

The H & M
Pipe Beveling Machine Co.
20 East 25th. - - Tulsa, Oklahoma

More pipe-line information is published each week in the Journal
More pipe-line men subscribe to the Journal
More manufacturers of pipe-line equipment advertise in the Journal
3 reasons why The Oil and Gas Journal is considered first in the pipe-line industry.

I. C. LITTLE

MAIN OFFICES: 1102 GULF STATES BLDG.
DALLAS, TEXAS
Central Warehouse: Valley Park, Missouri

Our part in this fascinating drama of pipelining has again demonstrated the fact that the I. C. Little organization is fully capable of handling the toughest of jobs in pipe line construction. Upon completion of our assignment on the Big-Inch Crude Oil Line, which entailed conquering one of the most precipitous mountain terrains ever penetrated, work was begun on our section of the paralleling Little Big-Inch Line. Watch for further Announcements of our progress!

THE MEN
BEHIND THE MEN

Under the Gun

These soldiers on the home front — geophysicists, party chiefs, engineers, shooters, shot hole drillers — are doing a commendable job, too. They are members without rank in the Services of Supply. On their shoulders rests the responsibility of finding oil for fuel, rubber and explosives needed for victory.

General
GEOPHYSICAL COMPANY HOUSTON

Exploration and Drilling

Week's Highlights

THE discovery of oil in the Madison limestone west of the old Pondera field again calls attention to the fact that, outside of West Texas, the Rocky Mountain area has become the most active area in the country for exploration.

Its remoteness from other major producing areas has prevented many operators from becoming interested in it and there appears to be a general lack of appreciation of its possibilities. Compared with the Illinois boom, the discovery of deep production in Elk basin has caused very little excitement, although this discovery is probably larger than any of the Illinois fields. The Big Horn basin, in which this field lies, is only one of a number of basins in this area, but it alone is larger than the Illinois basin.

None of the basins in Wyoming has been explored, except around the margins, and even the margins are untested throughout their length.

Geologically, the area is very complicated. In the north, the Rocky Mountains were thrust over the plains area, causing sharp folding in the foothills belt, with much overthrusting. This belt has not been tested to any extent in the United States in spite of the fact that Canada's largest field, Turner Valley, lies in its extension to the north. In eastern Montana the uplift which stretches from Central Kansas through the Black Hills forms the eastern rim of the largest basins in the Rocky Mountain states. Within Montana there are large domal uplifts such as the Sweetgrass arch, which has had important production on the northwest flank and provides excellent possibilities for more production all around it. In its general characteristics, it resembles the Sabine uplift of northern Louisiana, except that it is somewhat larger.

The southern part of the area is traversed by the central Rockies which are like a series of fingers, curving to the north and west. Inside each mountain arc is a basin containing up to 20,000 ft. of sediments with possibilities for structural and stratigraphic traps. The mountain-building which resulted in the present Rockies has taken place at frequent intervals from the Paleozoic to the present time so that there are numerous unconformities and wedge-edges in each basin, each of which affords an opportunity for the accumulation of oil. Structural movements around the margins of the basins have caused uplifts within them, just as in the Illinois and Michigan basins.

Two factors have operated against this area in the past. One of these is its remoteness from the country's principal markets which has acted as an unfavorable price differential. The other is the fact that much of the land is owned by the federal Government which has not proved a generous lessor. Where in most areas, lessors are content with one-eighth of the oil, the Government leases its land on a sliding scale based on the rate of production which greatly lengthens the time of payout for a successful well. The sale of leases by auction also makes the accumulation of large blocks difficult so that fields tend to be developed on a competitive basis.

The reduction of royalties during the war has been one cause of the recent blossoming of activity in the area which might be interpreted as a hint that the reduction should be made permanent.

CANADA: Development is planned for the Moose River basin in northern Ontario (p. 98).

WEST TEXAS: A new Clear Fork producing area has been opened up in Andrews County (p. 92).

LOUISIANA GULF COAST: New pools are in prospect in Beauregard and East Baton Rouge parishes (p. 90).

COMPLETIONS IN ALL FIELDS . . .

(Week ended September 4, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	Total comp. to date 1942
N. Y., Penna., W. Va.	48	21	7	76	162,349	2,290	2,333
Ohio	4	9	10	23	57,724	590	741
Indiana	2	0	2	4	6,946	151	221
Kentucky	7	1	6	14	31,832	270	142
Illinois	20	0	16	36	95,420	1,166	1,138
Michigan	1	4	10	15	36,795	384	473
Kansas	23	0	12	35	120,891	1,089	1,050
Nebraska	0	0	0	0	0	20	25
Missouri-Iowa	0	0	0	0	0	10	10
Oklahoma	17	3	19	39	120,700	798	816
Texas:							
North Central Texas	19	1	18	38	67,826	939	777
West Texas	27	0	4	31	146,395	577	998
Texas Panhandle	2	0	0	2	6,075	121	255
Eastern Texas	1	0	4	5	32,330	191	275
Texas Gulf Coast	6	0	7	13	83,767	301	511
Southwest Texas	10	3	14	27	127,359	607	764
Total Texas	65	4	47	116	463,752	2,736	3,580
North Louisiana	1	2	2	5	19,517	211	323
Louisiana Gulf Coast	4	0	1	5	44,278	245	348
Total Louisiana	5	2	3	10	63,795	456	689
Arkansas	2	0	0	2	15,100	163	116
Mississippi and Southeast	0	0	0	0	0	58	40
Montana	0	0	2	2	5,061	141	128
Wyoming	2	0	2	4	18,402	90	68
Colorado, Utah	0	0	0	0	0	18	12
New Mexico	0	0	0	0	0	144	162
California	12	0	7	19	82,241	875	497
Total United States	209	44	143	395	1,281,008	11,449	12,222
Total previous week	194	39	146	379			
Week ending Sept. 5, 1942	206	42	108	356			

ROCKY MOUNTAIN

Oil Found in the Madison Lime in Pendroy Test

DENVER, Colo.—Montana has scored its most important discovery of the year on the Pendroy structure in Teton County, within the Sweetgrass arch in Jarvis-Taylor 1 Goggin, C NE SE 7-27n-5w, which swabbed 10 bbl. an hour from the top of the Madison lime at 2,542-51 ft. after acidizing with 1,000 gal. The new field is located 3 miles north of the town of Pendroy, 18 miles southwest of Conrad, 5 miles west of the old Pondera field and 35 miles south of the Cut Bank field. It is in an area where wildcatting has been in progress intermittently for a number of years, many of the tests having small shows of oil, but nothing of commercial value. The oil has a gravity of 36°, and resembles the Pondera crude, but is believed to contain less sulfur. The well was started as a test to the Devonian, but will be completed in the Madison and another hole drilled to go to the original objective.

Surface evidence of structure in the area has been known for many years, but the geology has been difficult to determine on account of overlying drift. In 1936, R. C. Tarrant drilled 1 Wallenstein in 9-27-5w, 1¼ miles to the east of the discovery, had the top of the Madison at 2,492 ft., with some gas and rainbows of oil, but was uncommercial. E. B. Emrick, an independent geologist, finding evidence of faulting, arranged for a seismograph survey by the Heiland Research Corp. of Denver, which further indicated a major fault bisecting the structure from the northeast to the southwest. On the strength of these reports the structure gave evidence of being particularly favorable for a Devonian test, and the Gulf State Oil Co. and the Zodiac Oil Co. drilled in the SW SW 5-27n-5w, close to the suspected fault, went through it at around 1,400 ft., topped the Madison at 2,396 ft., and lost the hole at 2,525 ft. The same interests then moved 2½ miles to the northeast and drilled 1 Kellogg in 33-28-5w, on the downthrow side of the fault, and tested the Madison at 2,680-85 ft. without results. This temporarily ended the search for the pool believed to exist in the area.

Last winter when the Carter Oil Co. began farming out its big Montana blocks for a series of wildcats, I. W. Taylor, of the Taylor Drilling Co., of Centralia, Ill., an unsuccessful bidder for that contract, was shown the geology and seismograph surveys and was impressed with the possibilities of a Devonian test. Upon the surrender of an option on the block by one of the majors, he invited Jarvis Brothers & Marcel, Illinois producers, to join him in the test and they made a deal with George Coffee and others for the block of some 20,000 acres under a contract to go to the Devonian. The location selected is ¾ mile south and a little west of 1 Coffee-Wallenstein, and ½ mile back from and on the upthrow side of the fault definitely disclosed in the well to the north. It had the top of the Madison at 2,542 ft., where there was a show of oil. The 7-in. was cemented at that depth, and after drilling out the plug the hole was cored from 2,546 to 2,551 ft. Only 10 in. of the core was recovered, but it showed good saturation. A drill-stem test then was taken and showed 150 ft. of oil and 50 ft. of mud and oil. Tubing then was run, the hole acidized with 1,000 gal., and a swabbing test started. In the first 8 hours it recovered the 125 bbl. used in acidizing and an additional 175 bbl., and then it swabbed 10 bbl. per hour.

Eastern Colorado wildcat. — The Colorado Wildcat Oil Co. has spudded in a test in the Haswell district, Kiowa County, eastern Colorado, in its 1 Clark, SW cor. 2-18s-51w, with cable tools. It is in an area which attracted considerable attention in past plays in eastern Colorado. The location is 5 miles northeast of a diamond drill test put down in 1926 by the Minerals Exploration Co., which had a show of oil with water in the top of the Dakota at 1,173 ft., and was abandoned at 1,221 ft., and 9 miles northwest of the Gulf Oil Corp. 1 Rissner-Union Pacific, which went to 6,175 ft. and tested all horizons down to the granite. It is immediately east of the Arlington block of 22,000 acres held in 1936 by the Ohio, Magnolia, California and other companies.

Amerada to drill Colorado test.— The Amerada Petroleum Corp. is building derrick for a 7,000-ft. rotary test in Larimer County, northern Colorado, 3 miles southeast of the old Wellington field which produced from the Muddy sand at around 4,200 ft. Official description is 1 Fred H. Hartshorn, SE NE SW 15-9n-68w. It will start in a 17-in. hole and expects to spud by September 10. The deepest test in that general area was drilled in 1936 by the Continental Oil Co. in 31-10n-68w, in the Wellington field, 4 miles to the northwest, which went to the Sundance at 4,992 ft., total depth.

Gooseberry test abandoned. — General Petroleum Corp. 1 Government, on Gooseberry dome, which adjoins Little Buffalo Basin on the west, the latter scheduled for two deep tests this year, drilled 484 ft. of the Madison lime and found the horizon water bearing. It then plugged back and tested the Embar-Tensleep without results and abandoned the hole. The location is ¾ mile north of the discovery, drilled in 1937, which made 300 bbl. from the Embar-Tensleep. So far, the Madison is not showing up as well as expected in the Big Horn Basin fields, a test now being completed at Frannie in the Embar-Tensleep showing water in that horizon, and the Oregon Basin test being only a small well in the Madison.

WYOMING WILDCAT COMPLETIONS

Gooseberry, Park County: General Petroleum Corp. 1 Government, NW SW NW 28-47n-100w, T.D. 6,952 ft., top of Madison lime 6,468 ft., water in section, P.B. and tested Embar at 5,665-5,714 ft., dry.

MONTANA WILDCAT COMPLETIONS

East Kevin, Toole County: Northern Ordnance, Inc. 1-B State, C SE NE 31-35n-2e, dry at 1,983 ft. after testing Ellis-Madison.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 4 crude oil	Distillate, allied products	Sept. PAW quota all oils	Aug. 28 crude oil
Arkansas	76,400	3,800	80,100	76,365
California	777,350	45,300	835,000	770,450
Colorado	7,200	.....	6,500	7,050
Eastern fields	73,950	7,300	86,600	75,450
Illinois	211,850	11,100	222,800	210,000
Indiana	14,750	.....	13,800	13,350
Kansas	263,300	5,100	300,000	297,600
Kentucky	22,650	2,600	25,500	23,300
Louisiana	355,850	27,000	375,000	350,425
North Louisiana	82,350	.....	.....	81,925
Louisiana Gulf Coast	273,500	.....	.....	268,500
Michigan	56,900	100	60,100	56,950
Mississippi	51,650	.....	50,000	52,165
Montana	23,645	300	23,300	22,065
Nebraska	1,850	.....	2,000	1,900
New Mexico	105,150	5,100	116,600	105,500
Oklahoma	334,950	26,600	347,000	326,200
Texas	1,780,550	116,000	1,909,000	1,711,250
East Texas	376,150	.....	.....	371,000
West Texas	300,800	.....	.....	258,400
North Central Texas	140,500	.....	.....	140,400
East Central Texas	130,100	.....	.....	129,950
Texas Panhandle	101,400	.....	.....	98,000
Texas Gulf Coast	639,950	.....	.....	624,900
Southwest Texas	91,650	.....	.....	88,600
Wyoming	96,875	2,100	98,800	102,100
Total United States	4,244,870	252,400	4,552,100	4,202,120

Total production January 1-September 4, 1943 ..... 984,389,895 bbl.
Same period last year ..... 934,479,160 bbl.

We must be VIGILANT

Vigilance means alertness in the keenest sense of the word; and, never before in the history of this country has it been more necessary to be alert—alert to ill founded rumors—alert to the vital needs of our fighting forces—alert to lethargy and complacency which retards production.

Specifically important, though, is alertness to the condition of your motors. If properly maintained they will keep right on the job without a let-down, day after day, and year after year.

If you have not already done so, establish a dated maintenance schedule now. Check the air gap clearances and the bearings of motors, the control equipment and contact fingers, air in the distribution transformers, and periodically check the insulation resistance, loads on electric equipment and condensation and moisture on windings. Be vigilant—it pays!

Utility ELECTRIC POWER

PROPER MAINTENANCE WILL KEEP 'EM TURNING

Use Utility Electric Power!

PETROLEUM ELECTRIC POWER ASSOCIATION

Our Engineers on the ground knowledge of oil properties from Illinois to the Gulf Coast simplifies Oil Financing, making it easy for YOU to quickly obtain an oil loan.

THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

OKLAHOMA

Lincoln County Has New Wilcox-Dolomite Well

WILDCATS throughout the state were active last week. In Lincoln County, about 3 miles southeast of the old abandoned Meeker pool, Mid-Continent Petroleum Corp. 1 Fowler, SW SW NE 33-12n-4e, swabbed and flowed 150 bbl. of oil in 24 hours through perforations in dolomite at 5,542-48 ft. There was a small amount of water with the oil. Bottom-hole pressure 2,125 lb. Tubing is to be run for a complete production test.

Caddo County.—Denver Producing & Refining Co. deep test, the 1 Sah-Cam in SE SE 33-10n-10w, near Binger, was drilling ahead in a soft porous sand at 13,796 ft. For about two weeks the well had been drilling in hard cherty sand and averaging only a few inches a day so that when the bit entered the soft brown sand, hopes were high. However, gas started bubbling through the mud, which was soon followed by a brackish water. On a production test through the drill pipe, it flowed 25 bbl. of water an hour. Circulation was resumed and on last report it was drilling below 13,835 ft., with a hole full of water.

Offsets prove good wells.—Two wells, in two new areas, were exceptionally large producers. In Osage County, A. G. Oliphant's second test in the Big Bend pool, 20-25n-3e, flowed 668 bbl. of oil in 12 hours in sand at 2,855-81 ft. In the West Edmond pool of Oklahoma County, Fox-Schmidt 1 Ringer, NE SE 31-14n-4w, was completed flowing 1,385 bbl. of oil in 24 hours. Top of the Hunton was 6,895 ft. and perforations were at 6,931-84 ft.

OKLAHOMA WILDCAT COMPLETIONS

Cotton County: Walters area: G. G. Ruggles 1 Souder, NW NW SE 32-1s-9w, pumped 8 bbl., sand 2,305-20 ft., T.D. 2,325 ft.

Kay County: Sinclair Prairie 1 Cannon, N½ SW SW 7-26n-1e, dry, T.D. 4,133 ft., Simpson 4,105 ft., Wilcox 4,118 ft.

Kiowa County: Kerlyn Oil 1 Greb, SE SW SW 1-7n-17w, dry, T.D. 7,880 ft., Woodford 5,100 ft., Hunton 5,635 ft., Viola 7,460 ft., D.S.T. at 4,899-5,067 ft., flowed mud in 17 min., recovered mud and salty water, B.H.P. 2,300 lb.

Logan County: Danciger et al 1 McPeck, NE SE 18-18n-3w, dry, T.D. 6,424 ft., Viola 6,220 ft., Wilcox 6,320 ft., second Wilcox 6,412 ft.

Noble County: K. A. Ellison 1 Eyler, SE NE SW 10-21n-2e, dry, T.D. 4,460 ft. Layton 3,012 ft., Viola 4,341 ft., Wilcox 4,400 ft., second Wilcox 4,440 ft.

Deep Rock 1 Atkins, NW NW SE 25-23n-1e, dry, T.D. 4,750 ft., Viola 4,606 ft., Wilcox 4,672 ft.

Pawnee County: Alladin Pet. 1 Martin, SE SW NW 5-22n-5e, dry, T. D. 3,795 ft., Bartlesville 3,315 ft., Wilcox 3,790 ft.

Seminole County: Winona Oil 1 Tiger, SE SW NW 24-10n-7e, dry, T.D. 4,464 ft., Cromwell 3,607 ft., Viola 4,353 ft., Wilcox 4,412 ft.

KANSAS

New Arbuckle Production Found in Stafford County

A NEW Arbuckle Pool was opened in Stafford County last week, about 4 miles south and west of the big Silica area, at Stanolind Oil & Gas Co. 1-A Frank Hewitt, in SE SW 4-21-12w. The well was given an initial potential of 388 bbl. of oil a day in the lime at 3,404 ft., tota' depth.

New pay zones and extensions t old fields were reported during th week in Kansas. The Chase pool of Rice County was given a ½-mil north extension and also a new pa at Ackley & Quinlan 1 Keller SW NE SW 3-19n-9w. The well pumped 432 bbl. of 45-gravity oil in the Sooy sand at 3,241-44 ft. Production a' Chase has been in the Arbuckle lime at around 3,400 ft. In the South Silica pool of Barton County, W. N Bartlett 1 Weber, W½ SW NW 19-20-11w, added the Lansing lime as a pay zone to the pool when it made an initial potential of 1,011 bbl. at 3,259 ft.

KANSAS COMPLETIONS
Wildcats

Barber County: Pryor & Lockhart 1 Massey, SE NE 27-30-15w, flowed 100 bbl. an hr. through 1-in. choke after acid, Lansing 4,322-42 ft., T.D. 4,523 ft., P.B. 4,359 ft., discovery of NW Sun City.

Dickinson County: Ingling & Parker 1 Miller, S½ SE SW 30-14-1e, pumped 223 bbl., Burgess sand 2,483-85 ft., T.D. 2,518 ft., swabbed 17 bbl. an hr. 600 ft. off bottom, filled 1,000 ft. in 1 hr., gravity 31.7 corrected, discovery of Bonaccord pool.

McPherson County: Frank A. Schaeffer 1 Samuelson, SE NE SE 10-18-2w, dry, T.D. 2,925 ft., Kansas City 2,215 ft., Mississippi lime 2,894 ft.

Reno County: Phillips Pet. 1 Manning, SW SW NW 34-25-4w, swabbed 259 bbl. in 8 hr., Viola 4,099-4,102 ft., discovery of N. Hilger pool.

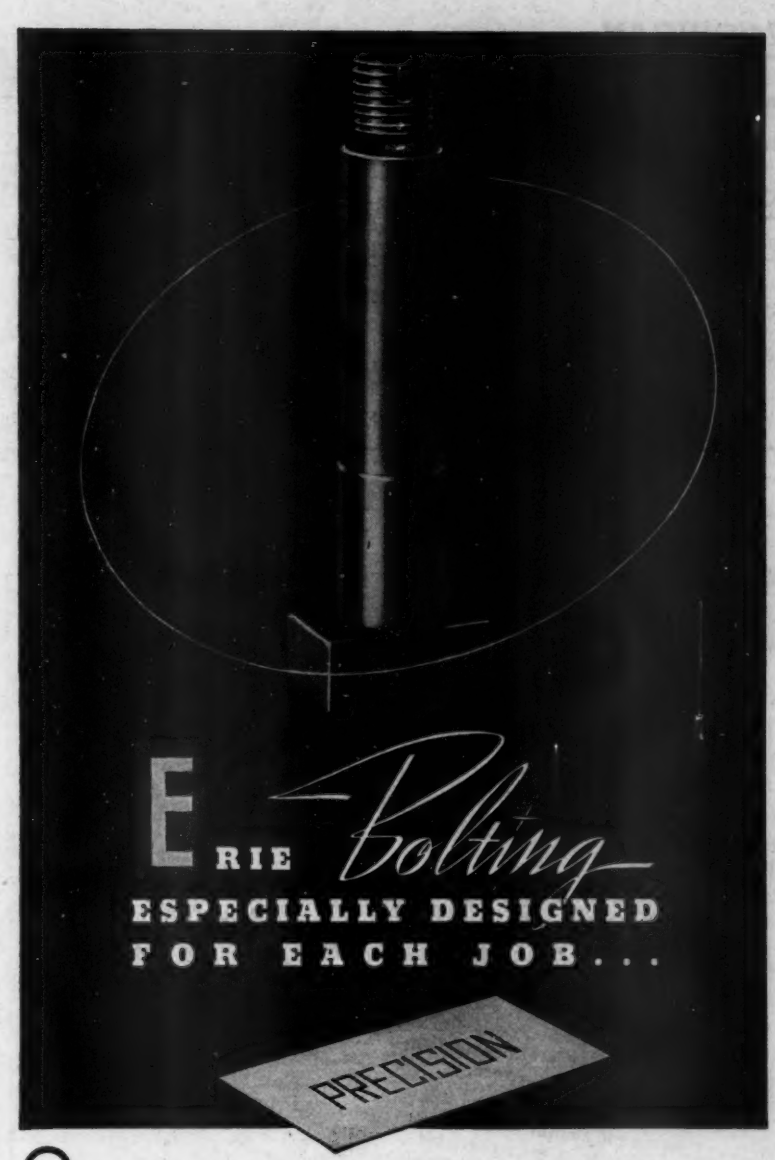
Stafford County: Phillips Pet. 1 Crawford, SW SW SW 10-25-12w, lost hole at 3,628 ft., Topeka 3,022 ft., Lansing 3,541 ft.

MISSOURI

ST. JOSEPH, Mo.—O. R. Newcomer et al 1 Lasell, C NW SW NW 8-64n-39w, Atchison County, Missouri, had a breakdown at 1,285 ft., some 38 short of where the operators hope to find Bartlesville sand. The test is 2 miles south of the Cities Service Oil Co. 1 Cook oil well, the only well in the Tarkio pool.

F. C. (Bob) Miller of Wichita was moving in tools, 4 miles east of Oregon, in Holt County, Missouri, for a test near the location Skelly Oil Co. drilled about a year ago.

Stanolind Oil & Gas Co. 1 Penney, 4 miles southeast of Grant City, 1-65n-31w, Worth County, Missouri, had the Hunton lime at 1,220 ft. and was drilling at 1,820 ft. with no shows.



OUR business has always been the making of bolts, studs and nuts to specifications with emphasis on the specials. Our customers are legion; 25 pieces here, a hundred there, and thousands for that special refinery-synthetic plant.

Today your Boss is our Boss and when we ask old customers to be patient, they know what we mean. We are working 100%, day and night, on vital war work, which as you know, is scheduled by Uncle Sam with the one thought of winning the war, not of winnning or holding good will. That part of business is reserved for peace time.

SPEED THE DAY OF VICTORY—BUY BONDS

MICHIGAN

Big Gas Flow Obtained In Newaygo County Well

SAGINAW, Mich. — Completion of a natural-gas well with an initial potential production of 19,000,000 cu. ft. per day was the outstanding development last week in Michigan. Operators reported a total of 15 completions, getting gas from four of them, oil from only one, while the other 10 tests were dry holes. Ohio Oil Co. drilled the big gas well on its Keilholtz lease in Norwich Township, Newaygo County. The oil producer, pumping 46 bbl. a day, is a Socony-Vacuum Oil Co. well in Bangor, Van Buren County.

WILDCAT COMPLETIONS

Antrim County, Echo Township; Edward B. Strom, tr., 1 Norton communitized, NW SE SW 30-21n-7w, dry in Traverse limestone, T.D. 637 ft.

Clare County, Freeman Township: Charles W. Teater 1 Freemon C. Gilmore, C S½ SE SE 14-18n-6w, dry in Monroe, T.D. 3,990 ft.

Kent County, Grattan Township; James J. McGerry, tr., 1 Charles Whitten estate, SE SE NE 7-8n-9w, dry in Monroe, T.D. 2,938 ft., P.B. to 2,916 ft.

Lake County, Yates Township: C. L. Maguire, Inc., 1 A. A. Keiser, SW SW SW 16-17n-12w, dry in Monroe, T.D. 3,385 ft.

Midland County, Mills Township: H. C. Nelson 1 Albert Miller, C S½ SW SE 12-16n-2e, dry in Dundee, T.D. 3,585 ft.

Osceola County, Osceola Township: Sun Oil Co. 1 Wilmer Pierson, C N½ NE SW 29-18n-8w, dry in Dundee, T.D. 3,891 ft.

8 Tested methods for conserving brake linings
1. Before drill pipe is run in, be sure water is on water-cooled rims.
2. Reverse bands for 40% greater life. This is possible if live and anchored ends are interchangeable and when anchored end is half-worn.
3. Use segmental form lining to simplify application . . . permit release of worn particles . . . and increase heat dissipation.
4. Before applying lining, stone or smooth rough rims.
5. Never use clay, oil or other foreign materials to control friction. Early lining replacement is often made necessary by gummed brake surfaces.
6. Check adjustment of brakes and clutches often. This will prevent unequal wear, and inefficient, noisy operation.
7. Keep bands in round and unkinked when relining. This assures longer life of lining by preventing localized heating and excessive high pressure areas. Also, reduces drum checking.
8. True up scored or heat-checked rims with whetstone if other equipment is not available.
START RIGS OFF RIGHT by using J-M 420 Rotary Lining. Tough . . . durable . . . assures easy load control, even feed-off and high braking efficiency. Send for brochure FM-10A. For further suggestions on conserving Friction Materials, as well as Packings, Insulations, Roofings and Refractory Cements, ask for the new J-M Manual "101 Suggested Good Operating Practices." Johns-Manville, 22 E. 40th St., New York, N.Y.
JM
JOHNS-MANVILLE 420 Rotary Lining

ILLINOIS

Iola Pool Extended and New McClosky Pool Opened

MATTOON, Ill.—The Iola pool in Clay County, which lies in Sections 13-14 and 15-5n-5e, was extended into Section 22, south of Section 15, by H. S. Williams et al 1 McGee, NW NW SE of the section. Aux Vases sand as topped at 2,347 ft. and pay was shot at 2,348-56 ft., responding with a 225-bbl. initial production. Later the well produced 158 bbl., 138 bbl. and 135 bbl. in successive 24-hour periods. Total depth is 2,358 ft.

Also in Clay County Sinclair-Wyoming Oil Co. 1 Hinterscher, a wildcat in Pixley Township, opened up production from McClosky lime at 3,013-28 ft., total depth 3,054 ft. The well pumped 42 bbl. of oil and 90 bbl. of water initially.

A promising wildcat in Jefferson County was J. H. Williams et al 1 Dalton, C SE NW 13-2s-4e, which was showing oil from McCloskey lime at 3,114-18 ft. In a drill-stem test gas appeared in nine minutes and oil flowed in 18 minutes, continuing until the tool was closed. The test is 2 miles north of the Bluford pool.

Deep Oil Co. 1 A. E. Sutton, a wildcat in S½ NW SW 33-2s-10e, Edwards County, was showing for a McClosky producer at 3,330-40 ft. The well flowed naturally, producing 32 bbl. of oil and 6 bbl. of water in an hour.

E. A. Obering 1 J. H. McGee, NE NE SW 30-5n-7e, Clay County, a wildcat, swabbed 408 bbl. of clean oil in 24 hours from McClosky lime at 2,338-46 ft. and was being prepared to pump. It is southwest of Bible Grove.

Gulf Refining Co. opened a pool in Haines Township, Marion County, with its 1 Floyd, SE SE NW 25-1n-3e, which swabbed 241 bbl. of oil and no water from McClosky lime at 2,730-40 ft., hich had been treated with 2,000 gal. of acid. Gulf has a promising wildcat test in Jefferson County 1 McNail, NW SE NE 23-1n-4e, which showed saturation in McClosky lime at 2,880-92 ft. It was being tested.

Twenty oil wells and 16 dry holes were completed in the state during the week. Initial production averaged 129 bbl. per well, or a total of 2,075 bbl. Only seven new oil wells produced in excess of 100 bbl. initially.

Forty-one new operations were started, including the following 11

wildcats: Ashland Oil & Refining Co. and Ledbetter 1 McCarty, C NE NE 1-6s-9e, White County; McBride, Inc. 1 L. Woodridge, SW SW NE 22-5n-5e, Clay County; Skelly Oil Co. 1 R. Wilson, NE SE SW 11-2s-4e, Jefferson County; Sohio Oil Co. 1 Jefferson Oil & Gas Co., NW NW NW 16-4s-2e, Jefferson County; Luttrell 1 Nolting, NE NW NE 33-1n-1w, Clinton County; National Petroleum 1 Ansell, SE NE NW 13-3s-1e, Jefferson County; Ohio Oil Co. 1 H. Stillwell, SW SW SE 21-1n-12w, Wabash County; Superior Oil Co. 1 H. Earhart, NW SE SE 25-2s-10e, Edwards County; Charles McLaughlin 1 Hersch, SW cor. NE NW SE 11-2s-1w, Monroe County; F. J. Kubat 1 Johnston, C NW NE 14-4s-10e, White County, and Robinson & Puckett 1 Puckett, SE SE NW 17-2s-8e, Wayne County.

ILLINOIS WILDCAT COMPLETIONS

Clay County: Sinclair-Wyoming 1 Hinterscher, C NE SE 4-4n-8e, pumped 42 bbl. oil, 90 bbl. water, McClosky lime at 3,013-28 ft., acid. Pool opener.

H. S. Williams et al 1 McGee, NW NW SE 22-5n-5e, pumped 225 bbl. following shot at 2,348-56 ft., T.D. 2,358 ft., pumped 158 bbl., 138 bbl., and 135 bbl. in following successive 24-hr. tests; 2 per cent cut of water on last day. Pool opener.

Fayette County: J. H. Hudson 1 Feller, SE NW SW 23-6n-3e, dry at 2,215 ft., Menard 1,462 ft., Glen Dean 1,652 ft., Golconda 1,696 ft., Barlow 1,782 ft., Cypress 1,819 ft., Paint Creek 1,942 ft., Benoist 1,972 ft., Aux Vases 2,052 ft., Ste. Genevieve 2,090 ft., Rosiclare 2,105 ft., Fredonia 2,120 ft., McClosky 2,145-48 ft. and 2,182-89 ft.

Jefferson County: Sohio 1 Interstate Coal Co., NW NW SE 8-4s-2e, dry at 2,179 ft., Menard 1,922 ft., Tar Springs 2,051 ft., Glen Dean 2,132 ft., lower Glen Dean 2,150 ft.

Lario 1 Pierce Holloway, NW SE NE 15-1s-4e, dry at 2,980 ft., Fredonia lime 2,866 ft., McClosky 2,868-83 ft. and 2,963-80 ft., acid.

Richland County: Ashland 1 Friedly-Provines, S½ SE NE 4-2n-4w, dry at 3,198 ft., Menard 3,274 ft., Vienna 3,388 ft., Tar Springs 3,428 ft., Glen Dean 3,516 ft., Hardingsburg 3,544 ft., Golconda 3,631 ft., Barlow 3,701 ft., Cypress 3,789 ft., Weiler 3,816 ft., Paint Creek lime 3,865 ft., Paint Creek sand 3,900 ft., Benoist 3,926 ft., sand 3,939 ft., Renault 3,979 ft., Aux Vases 3,010 ft., Ste. Genevieve 3,047 ft., Levias 3,076 ft., Fredonia 3,120 ft., St. Louis 3,156 ft., McClosky 3,094 ft.

First National Trust 1 R. Paddock, C E½ NE SE 8-3n-10e, dry at 3,253 ft., Vienna 3,363 ft., Tar Springs 3,376 ft., upper Glen Dean 2,509 ft., Hardinsburg 2,520 ft., Golconda 2,580 ft., Barlow 2,690 ft., Cypress 2,714 ft., Weiler 2,768 ft., Benoist 2,917 ft., Benoist sand 2,924 ft., Renault 2,963 ft., Aux Vases 2,994 ft., Ste. Genevieve 2,049 ft., Fredonia 3,101 ft., McClosky 3,239 ft.

St. Clair County: L. A. Driscoll 1 Engle, SE SE NW 29-1n-6w, dry at 2,452 ft., Golconda 443 ft., Barlow 545 ft., Cypress 560 ft., Paint Creek 650 ft., Renault 690 ft., Ste. Genevieve 750 ft., St. Louis 813 ft., Devonian 1,760 ft., Maquoketa 2,205 ft., Trenton 2,549 ft., Plattin 2,452 ft.

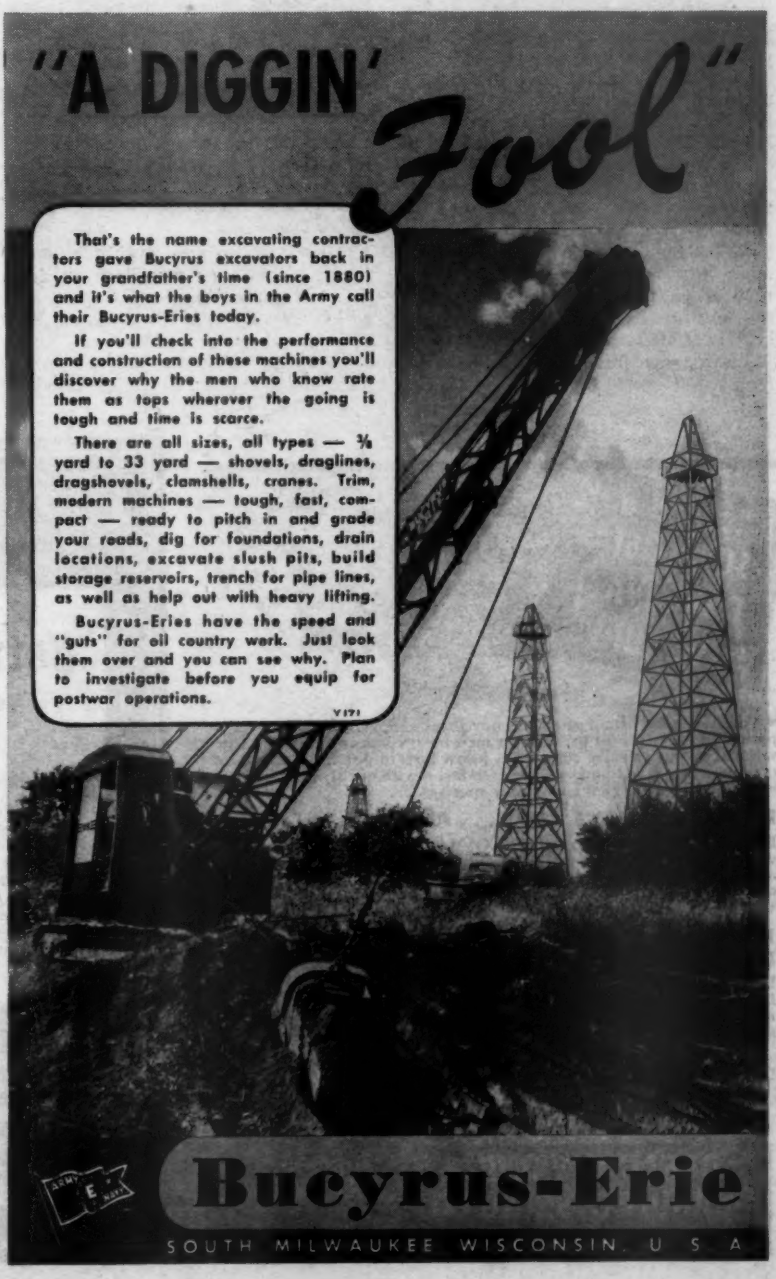
Wayne County: Pure 1-A Kast-A, NE NE NE 24-1n-7e, dry at 3,182 ft., Tar Springs 2,485 ft., upper Glen Dean 2,560 ft., lower Glen Dean 2,575 ft., Hardinsburg 2,599 ft., Golconda 2,660 ft., Barlow 2,750 ft., Paint Creek lime 2,901 ft., Benoist 2,948 ft., lower Renault 3,033 ft., Aux Vases 3,042 ft., Ste. Genevieve 3,116 ft., Fredonia 3,166 ft.

APPALACHIAN FIELDS

Laurel Ridge Wildcat Finds Oriskany Dry

PITTSBURGH, Pa. — On Laurel Ridge in Ligonier Township, Westmoreland County, the deep test of the New Penn Development Co., William E. Snee, et al topped the Oriskany sand at 8,847 ft. and 10 ft. in that formation it was void of any showing. The sand appears good. Here the surface elevation is 2,785 ft.; Onondaga chert 8,695 ft. The chert section of 152 ft. is 23 ft. thicker than that of the test on the Indiana Savings & Trust Co. on the Menocher Highway in Fairfield Township. To the Oriskany, the new test is 6,062 ft. subsea and in the Fairfield Township test 5,039 ft. The difference may be represented by the difficulty of cable-tool drilling in sharply dipping formations as the new test after survey was at one time 700 ft. off vertical.

Fayette County. — In South Union Township, Fayette County, New Penn Development Co., William E. Snee, et al bottomed deepening 1 Heyn at 7,508 ft. and it is believed in the top of the Silurian from which added gas brought the initial to over 600,000 cu. ft. The derrick will be left at the hole for possible added depth.


"A DIGGIN' Fool"
That's the name excavating contractors gave Bucyrus excavators back in your grandfather's time (since 1880) and it's what the boys in the Army call their Bucyrus-Eries today.
If you'll check into the performance and construction of these machines you'll discover why the men who know rate them as tops wherever the going is tough and time is scarce.
There are all sizes, all types — ⅜ yard to 33 yard — shovels, draglines, dragshovels, clamshells, cranes. Trim, modern machines — tough, fast, compact — ready to pitch in and grade your roads, dig for foundations, drain locations, excavate slush pits, build storage reservoirs, trench for pipe lines, as well as help out with heavy lifting.
Bucyrus-Eries have the speed and "guts" for oil country work. Just look them over and you can see why. Plan to investigate before you equip for postwar operations.
V171
Bucyrus-Erie
SOUTH MILWAUKEE WISCONSIN U S A

LOUISIANA GULF

Gas-Distillate Production Found in Beauregard Parish

NEW ORLEANS, La.—A gas and distillate well of uncertain size is reported to be in the making at Sohio Producing Co.'s 1 Lutcher-Moore Lumber Co., 1¾ miles west of Fields, in Beauregard Parish. Plugged back to 8,076 ft. from total depth of 10,911 ft., this wildcat was flowing an unestimated volume of gas and distillate into pits through ¼-in. choke, with perforations at 8,014-20 ft. Flowing tubing pressure was 2,500 lb. and shut-in tubing pressure 2,900 lb. Gravity and gas-oil ratio were not taken.

Showing for a producer was Shamrock Oil Co. 1 Phillips, in the Hallet's Bluff area of East Baton Rouge Parish. This wildcat, with total depth of 9,874 ft., plugged back to 9,591 ft., flowed at a recorded daily rate of 295 bbl. of 43.6 gravity oil through 10/64-in. choke, with perforations at 9,570-75 ft. It was believed, however, that this gage probably was inaccurate, for the choke was found to be plugged soon after the gage had been taken.

Testing continued at Amerada Petroleum Corp. 1 Daigle, 1¼ miles northeast of Church Point, in Acadia Parish. On an 18-hour gage the well flowed 79 bbl. of water-white distillate, 10 hours on 5/32-in. choke and 8 hours on ⅛-in. choke. Maximum tubing pressure was 3,700 lb. and gas-oil ratio 13,200. Sun Oil Co. and Continental Oil Co. 2 Homeseekers Development Co., in 54-10s-1w, Acadia Parish, was drilling below 3,050 ft. in shale. Continental's 2 Acadia Parish School Board, north of the Richie field, second test in that area, as in sandy shale at 5,340 ft.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Calcasieu Parish: George W. Frankos 1 Le Bleu estate, 28-9s-7w, location abandoned.

Rapids Parish: Moran Oil Co. 1 Meeker, 6-1n-13, dry at 8,142 ft.

TEXAS GULF COAST

Wharton, Fayette County Wildcats Make Small Flows

HOUSTON, Tex.—Nothing conclusive has been reported yet from the 1 Claude Appling, wildcat test which W. Stewart Boyle and John Mayo are drilling in Wharton County, 1 mile west of Louise, and which has yielded oil shows. Bottomed at 6,009 ft., the well at latest reports was flowing into burning pits at an estimated rate of 5 bbl. daily, through 5/64-in. choke, with perforations at 4,088-90 ft. It was intended to let the well continue flowing several days. Tubing pressure was 1,360 lb. and casing pressure 1,665 lb.

Another wildcat which has not yet revealed definitely what it is going to do is Continental Oil Co. 1 Cockrell, in the J. T. Whiteside Survey of Fayette County. Following a squeeze job at this well, which is bottomed at 4,498 ft., the casing was perforated at 1,189-91 ft. The well was washed and allowed to stand. When it was put on a ½-in. tubing choke no pressure was recorded, and it was estimated to have made 1 to 2 bbl. an hour of oil and wash water. When a 15/64-in. choke was used the well began jetting at intervals and then began flowing about ½ bbl. of oil an hour under its own pressure and by jetting. At the week end it was reported to be testing a barrel of oil an hour.

TEXAS GULF COAST WILDCAT COMPLETIONS

Burleson County: B. C. Burkowski, trustee, 1 C. E. Cade, Jr., 4 mi. W of Caldwell, dry at 3,696 ft.

Fort Bend County: Northern Ordnance Co. 1 W. J. Morrow, J. McKnight Sur., A-292, dry at 7,617 ft.

Jackson County: Humble 1 C. L. Hensley et al, 5 mi. S of Lolita, dry at 9,100 ft.

Wharton County: Stanolind 1 A. J. Wendell, 4½ mi. W of Wharton, dry at 6,000 ft.

● You hear that pretty often in your local supply store. For over a period of 35 years oil production men have come to know the true value of quality in valve cups. They know how important it is to have them *accurate in size* and *uniform in texture*—with quality built in from beginning to end. That's why they specify . . .

DARCOVA VALVE CUPS . . . *At Your Supply Store*

For over thirty-five years, DARCOVA—the original composition valve cup—has faithfully and economically served oil production, at *all* depths, under the severest service conditions. Precision manufactured in a variety of textures and sizes, DARCOVA VALVE CUPS will give you *longer, safer, better* service.

***Take Advantage of the* FREE DARCOVA SURVEY SERVICE**

Let a Darcova engineer demonstrate his 3-Point Lower Lifting Cost Program to you. There is no obligation. Phone, wire or write—or ask any supply store. Darcova offers a complete line of Pumcups, Pistons, Valve Cups, Balls and Seats, Seating Cups, Seating Rings for oil well and reciprocating pumps.

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT, PENNA.

SPERRY-SUN

Better To Be SAFE Than Wrong

Anything less than the best in well surveys is poor economy. The assurance of speed, accuracy and more profitable operation warrants the use of Sperry-Sun Surveying Devices and Technical Services.

SURWEL Clinograph	H-K Single Shot
SYFO Clinograph	M-M-O Bottom Hole Orientation
E-C Inclinometer	K-K Whipstock
H-K Inclinometer	Polar Core Orientation

SPERRY-SUN WELL SURVEYING CO.
PHILADELPHIA, PA.
HOUSTON, TEXAS — LONG BEACH, CALIF.

N. CENTRAL TEXAS

Offset to Burns-Midway Discovery Running Low

WICHITA FALLS, Tex. — Several North Texas wildcats and extension tests were at critical depths as the week ended.

Clay County.—L. T. Burns 2 M. M. Lyles, west offset to the discovery of the Burns-Midway Mississippi lime pool, set 7-in. casing at 6,064 ft. in Mississippi lime, and was drilling plug. Information on the test is being withheld, but some geologists believe that the test is running 75 ft. lower on top of the Mississippi lime than the discovery, giving credence to the belief that the Burns discovery well is on the west side of the same structure as the Buffalo Springs discovery, Continental Oil Co. and W. B. Omohundro 1 T. J. Stephens, G. W. Stipps Survey. Continental Oil Co. 1 W. Hilburn, E. W. East Survey, which was a failure in the Ellenburger at 6,470 ft., was plugged back to test the Strawn sands, and was showing considerable gas through the mud and was unable to lower fluid below 3,800 ft.

Montague County. — Continental 1 H. C. Gadberry, 1-mile-east outpost to the Hildreth Simpson and Caddo conglomerate field, topped Viola lime, Ordovician age, at 6,643 ft., and was drilling in dry lime at 6,750 ft., expecting the Simpson momentarily, and will probably run casing to test.

NORTH TEXAS WILDCAT COMPLETIONS

Baylor County: American Liberty 1 Ray Horany, 330 ft. from N and W, 160-acre lease Sec. 2478, T.E.&L. Sur., 3½ mi. E of Westover, dry, T.D. 2,020 ft.

Clay County: Bridwell Oil 2 Harrison & Allen, 1,292 ft. from SE, 1,050 ft. from SW, Jane Duncan Sur., dry, T.D. 1,240 ft.

Bridwell Oil 3 Harrison & Allen, 5,340 ft. from SE, 200 ft. from SW, Jane Duncan Sur., pump 55 bbl., sand pay 1,144 ft., T.D. 1,149 ft.

Foard County: The Texas Co. 1 W. H. Nichols et al, 2,456 ft. from N, 660 ft. from E, 677-5-acre lease, Sec. 298, Blk. A, H.&T.C. Ry. Sur., dry, T.D. 5,790 ft., dolomite.

Throckmorton County: T. S. Stanfield 1 Mary E. Crump, Sec. 683, T.E.&L. Sur., dry, T.D. 400 ft.

T. S. Stanfield 1 T. T. Daws, Sec. 932, T.E.&L. Sur., dry, T.D. 842 ft.

T. S. Stanfield 1 Gillie Morrison, 1,200 ft. from N, 930 ft. from W, Sec. 910, T.E.&L. Sur., dry, T.D. 555 ft.

Young County: Sinclair Prairie Oil 1 A. J. Ernest, 2,919 ft. N, 660 ft. W of SW cor. Wm. Tryndale Sur., but in S. Peterswick Sur., dry, 4,820 ft., show oil 4,821-31 ft., Ellenburger 5,210 ft., T.D. 5,250 ft.

W. E. Prod. 1 R. E. Caswell, 467 ft. from N and E of W 120 acres of N 24 acres of Sec. 624, T.E.&L. Sur., 5 mi. S of Jean, dry, Caddo 3,918 ft., show oil at 3,918-50 ft. and 3,960-76 ft., Mississippi lime 4,934-39 ft., T.D. 4,939 ft.

WEST CENTRAL TEXAS

ABILENE, Tex.—Operations in the West Central Texas district remained quiet.

In Stephens County, in the Lee Ray townsite, the Woodley Petroleum Co. 1 G. W. Thorpe tested 13,000,000 cu. ft. of gas at total depth 3,606 ft., and was testing further before completing.

The Loving pool of western Stephens County was extended about ½ mile northwest when Wittmer, Knight & Ewing 1 B. H. Compton flowed 60 bbl. per hour on a short test, and was preparing to complete.

In Jones County, Hunter & Hunter were moving in on another deep test east of Hawley after completing the initial try as a dry hole. The new test is 1-B Bert Fields, 1,830 ft. from north 660 ft. from east lines of a 563-acre lease, Samuel Andrews Survey. In the Patterson pool, Fain & McGaha 1-B Patterson hit the Tannehill sand flat with the discovery, at 2,194 ft., showing only a small amount of oil, and was drilling below 2,210 ft. headed for the Wimberley pays. In the Wimberley pool, several operators are planning to dual complete the wells after drilling deeper to the Gunsight pay.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County: D. H. Brock et al 1 P. E. Rice, 905 ft. from N, 330 ft. from Colorado River, 157-acre tract, C. Messer Sur., dry, T.D. 1,049 ft.

Central Texas Gas 1 fee, 660 ft. from N, 840 ft. from E, 900 ft. from W, 100-acre tract, Blk. 5, W. K. Dalton Sur., dry, T.D. 1,924 ft.

Comanche County: McClung Bros. 1 H. J. Winfrey, 250 ft. from S and W, 100-acre, tract, Lampasas County School Land Sur., dry, T.D. 300 ft.

Engineered to your Specifications

TRADE MARK REG. U. S. PAT. OFF. Velvetouch

THE S. K. WELLMAN CO. 1374 EAST 51ST STREET CLEVELAND OHIO U.S.A.

PIONEERS IN PUTTING POWDER METALLURGY TO WORK FOR INDUSTRY

What's New IN SAFETY

NEWS ABOUT SAFETY EQUIPMENT AND METHODS

One day delivery

We've been stepping up production facilities on the Tuff Nut Hat for better than a year, but increased demand has kept a sizeable back order file on our desks, until the most recent production increase.

Now, for the first time since the start of the war, we can offer one day delivery from stock. All of which will simplify the procurement problem of some overworked buyer, and at the same time please employees, because the Tuff Nut Hat keeps them safe and keeps them comfortable. Available for men and women. We ran the woman picture because we thought you'd like her better.

Web belt bulletin

Even old timers, brought up on leather belts and weaned away by priorities, now cheerfully admit that many of us web belters have been right. So we continue to say to industry that where you have a falling body hazard, the proper web belt gives greater security, with lighter weight and more comfort.

To present the entire line for industry's selection, we've just compiled a brief bulletin that pictures and describes six different types of Bullard web belts for six different industrial usages. If you're interested, write for the Web Belt Bulletin.

★ ★ ★

More complete information on any of the above items may be had by writing for product literature. Descriptions are condensed from the bulletin "What's New in Safety," which will be mailed to you monthly on request. 34-43

E. D. BULLARD CO.

275 EIGHTH STREET, SAN FRANCISCO, 3, CALIF.

LOS ANGELES · CHICAGO · HOUSTON · SEATTLE
SALT LAKE CITY · DENVER · EL PASO · NEW YORK

EVERYTHING BULLARD IN SAFETY

PERMIAN BASIN

Clear Fork Lime Pool Opened in Andrews County

MIDLAND, Tex.—Union Oil Co. 1 J. D. Biles, NW NE Section 19, Block A-31, Public School Land Survey, 5 miles northwest of the Fullerton pool, opened another Clear Fork lime producing area for Andrews County when it was officially completed flowing 460.42 bbl. 41.9 gravity oil through 40/64-in choke from pay topped at 6,945 ft., total depth 7,459 ft., plugged back to 7,446 ft., and the casing perforated with a total of 605 shots. The formation had been treated with 12,000 gal. acid before the test of production was made.

Union started a north offset to the discovery, SW SE Section 12, Block A-31, Public School Land, but a rapid development program is not forecast, as the acreage around the new strike is held closely by Union, Stanolind Oil & Gas Co. and Shell Oil Co., Inc.

Humble Oil & Refining Co. 1 Crews & Mast, SW SE Section 8, Block A-34, Public School Land, was bottomed at 9,176 ft., preparing to take drill-stem test, but no showings of oil or gas were reported at this depth. Humble 1 W. F. Carter, SE SW, Section 23, Block A-46, Public School Land, deep test in the Deep Rock area, was drilling below 8,200 ft., in lime and shale. Skelly Oil Co. has staked a west offset to the recent Holt pay discovery well completed in Section 28, Block 9, University Survey, and was drilling below 6,000 ft. on 1-M University, a wildcat in Section 28, Block 1, University Survey, 5½ miles east of the discovery.

Gaines County.—Humble 1 R. A. Cox et al, Section 14, Block A-11, Public School Land Survey, cored lime showing oil from 5,048-68 ft., and from 5,068-84 ft., and additional cores were taken to total depth 5,210 ft., but the lime was not porous. The test is scheduled to go to 9,000 ft., but a test of the Permian zones will be made in progress.

Attempt to complete in the regular upper Permian horizons will be made at Amerada Petroleum Corp. 6 Robertson, deep failure at total depth 9,312 ft., on the east side of the Seminole field. Casing has been perforated with 298 shots from 5,185 to 5,262 ft., and an acid treatment will be administered.

Borden County.—Liner was being run at W. S. Guthrie and Cosden Petroleum Co. 1 Conrad, old dry hole being deepened, in Section 79, Block 20, Lavaca Navigation Survey. The well had show of oil from 4,008-72 ft., and more from 4,148-49 ft., with a hole full of water at total depth 4,184 ft.

Irion County.—Pure Oil Co. 1 J. D Sugg, Section 1942, Althossen Survey, northwestern part of the county, had a small show of oil at 1,842-52 ft. in lime, with sulfer water at 1,999-2,007 ft., and the well was being drilled deeper.

Winkler County.—Possible production from the Clear Fork lime was indicated at Richardson & Bass 4 J. B. Walton, SW SW Section 5, Block B-2, Public School Land, Keystone pool, which had 6,000 cu. ft. of gas through perforations at 4,680-4,850 ft., with a small amount of oil, but water broke in, and a squeeze job was run to try to shut off the water. The well is ½ mile southeast of the Key-Ellenburger discovery.

Howard County.—New wildcat project for the county is Northern Ordnance Co. 1 J. W. Cook, SE NW Section 23, Block 34, T-1 N, Texas-Pacific Railway Survey, 7 miles west of Big Spring, scheduled to go 3,200 ft.

Hockley County.—Brown & Wheeler 1 Earl French is a new location for 6,500 ft. Clear Fork lime test, 660 ft. from South and West Labor 22, League 74, Haskell County School Land Survey, 9 miles northest of Levelland.

WEST TEXAS WILDCAT COMPLETIONS

Andrews County: Skelly Oil 1-K University, 660 ft. from S and W, Sec. 28, Blk. 9, University Sur., 2 mi. E of Emma pool, elev. 3,189 ft., pump 177 bbl. 33.3 gravity, Holt lime pay 5,464 ft., acid 1,500 gal., P.B. to 5,550 ft. from T.D. 7,500 ft. Discovery.

Union Oil of California 1 J. D. Biles, 1,980 ft. from E, 660 ft. from N, Sec. 19, Blk. A-31, Public School Land, 5 mi. NW of Fullerton pool, elev. 3,381 ft., flow 460 bbl., 41.9 gravity, Clear Fork lime pay 6,945 ft., perf. 605 shots, acid 12,000 gal., P.B. to 7,446 ft., from T.D. 7,459 ft. Discovery.

Dawson County: Darby Pet. 1 Annie Harris, 440 ft. from S and W, Labor 16, Lge. 268, Moore County School Land, elev. 2,590 ft., San Andres lime 4,570 ft., dry, T.D. 5,512 ft.

Howard County: Cosden Pet. 1 W. R. Read, semiwildcat, 330 ft. from N, 2,310 ft. from W, Sec. 48, Blk. 30-1n, T.&P. Ry. Sur., elev. 2,325 ft., I.P. 368 bbl., pay 2,680 ft., T.D. 2,908 ft. Extension to Iatan-East Howard pool.

Sterling County: R. L. Cannon and B. C. Mann 1 W. L. Foster, 660 ft. from E, 1,980 ft. from S, Sec. 4, Blk. 21, H.&T.C. Ry. Sur., elev. 2,515 ft., show dead oil 2,335-2,460 ft., dry, T.D. 2,793 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Further exploration for Ellenburger production in Lea County will be in the Skaggs area, east of the Monument pool, where Continental Oil Co. staked location for an 11,000-ft. test, SE NE, 23-20s-37e. The other Ellenburger test for the county, Humble Oil & Refining Co. 1 Federal-Leonard, SW SW 12-36s-37e, as drilling below 2,675 ft. In Chaves County, Humble was building derrick for 1-N State, 7,500-ft. project in 25-14s-17e, on the Manning dome. Eight miles southwest of Tatum, Lea County, B. H. Nolan 1 Alston is to be a cable-tool test, in SW SW 17-13s-35e.

EASTERN TEXAS

Smackover Lime Test Finds Oil Shows

DALLAS, Tex.—Sun Oil Co. 1 Rutledge, E. Parson Survey, northeast Kaufman County, a deep wildcat which had showing of oil in the Smackover lime from 10,042-57 ft., recovered lost drill stem and was preparing to run a string of 5½-in. casing to make a production test before coring further into the Smackover section. Fear of sticking the drill pipe again influenced the operators to run the string of pipe. Topping the Smackover at 10,042 ft., two 10-ft. cores were taken from 10,037-57 ft., but only 2½ ft. of the second core were recovered, which was reported to be very soft with oil showing. There was no live oil in the hole when the drill stem was recovered.

Robertson County. — Another Smackover lime wildcat has been staked in Robertson County, A. G. Hill et al 1 W. C. Anderson, 330 ft. from southeast, 330 ft. from easterly west line of a 245-acre tract, Jos. Webb Survey, 3 miles northwest of Calvert, in the western part of the county.

Cherokee County.—T. G. Shaw 2 P. J. Bowling, a wildcat 2½ miles southeast of Lone Star, is to be cased at about 3,900 ft. to test the Woodbine sand. The well is approximately 4,050 ft. from west, 3,250 ft. from south lines of the W. H. Walters Survey, and elevation is 377 ft. The test was drilling below 3,975 ft.

Anderson County. — Carter-Gragg Oil Co. 1 Jaramillo, Eliz. Groce Survey, a wildcat 2 miles north of Concord pool, was drilling below 4,308 ft. in shale.

Morris County.—Humble Oil & Refining Co. 1 H. N. Wright, 1½ miles southwest of Omaha, was drilling below 8,332 ft. with top of Travis Peak called at 7,526 ft. Elevation is 338 ft.

Hunt County.—Stanolind Oil & Gas 1 Bickley, E. F. Anderson Survey, Commerce area, was drilling below 5,515 ft. in lime.

EAST TEXAS WILDCAT COMPLETIONS

Freestone County: R. L. Wheelock 1 F. E. Hill heirs, 660 ft. from E, 1,980 ft. from S, 276-.8-acre tract, H. Sheppard Sur., 2 mi. NW Fairfield, elev. 406 ft., Pecan Gap 2,563 ft., Austin chalk 3,438 ft., Eagleford shale 3,809 ft., Woodbine sand 4,133 ft., dry, T.D. 4,500 ft.

Van Zandt County: Rogers Lacy 1 T. A. Paul, 467 ft. from E, 731 ft. from S, 45.3-acre tract, Jas. Cheshire Sur., ½ mi. SE Fruitvale, elev. 494 ft., Pecan Gap 2,377 ft., Austin chalk 3,523 ft., Eagleford shale 3,930 ft., Woodbine 4,425 ft., Georgetown 5,237 ft., Goodland 6,313 ft., dry, T.D. 6,515 ft.

Wood County: A. H. and C. L. Rowan and Southland Royalty 1 H. T. Garrett, 1,069 ft. from S, 912 ft. from W, 219-acre tract, Polly Tier Sur., 7 mi. SE Winnsboro, dry, T.D. 6,859 ft.

For 27 Years....
WHEATLEY BROS.
PUMP & VALVE MFRS.
Now
FRANK WHEATLEY
PUMP & VALVE MFR.
HALE STATION
TULSA, OKLA.

PAGE FENCE
America's First Wire Fence—Since 1883

Protect Your Protection!

● Whatever property your chain link fence encloses, that fence is now "critical material." Because replacement may not be possible for some time to come, you will be wise if you have your present fence inspected now and serviced expertly by Page-trained men. Their long, specialized experience and their knowledge of localized conditions affecting fence metals, qualify them to extend the protective life of your fence. Write for name of Association member nearest you and discuss fence servicing with a factory-trained expert. Address PAGE FENCE ASSOCIATION, Headquarters: Monessen, Pennsylvania.

PRODUCT OF PAGE STEEL & WIRE DIVISION • AMERICAN CHAIN & CABLE COMPANY, INC., BRIDGEPORT, CONN.

CRUDE PRICES

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21	...	...	...	...	$.85	$.75	...
21-21.9	...	...	...	...	.87	.78	...
22-22.9	...	...	...	...	.89	.81	...
23-23.9	...	...	...	...	.91	.84	...
24-24.9	...	...	...	...	.93	.87	...
Below 25	$.92	...	...	$.86	...	...	...
25-25.9	.95	$.95	...	.88	.95	.90	...
26-26.9	.97	.97	...	.90	.97	.93	...
27-27.9	.99	.99	...	.92	.99	.96	...
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	...
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	...
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

Column 1 Mid-Continent grades:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

Column 2 Mid-Continent grades:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

Column 3 Mid-Continent grades:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

Column 4 Jackson and Tillman counties:
Gulf Oil Corp., 5-20-41.

Column 5 Mid-Continent grades:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

Column 6 Mid-Continent grades:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

Column 7 Oklahoma:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland	$1.14

Pure Oil Co., 9-4-41.

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

Column 1 applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

Column 2 applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

Column 3 applies to Little Creek, Olla, and South Olla (4-3-43).

Column 4 applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

Column 5 applies to University (Baton Rouge). Posted 6-2-42.

Column 6 applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

Column 7 applies to Abbeville, Louisiana.

Stanolind Oil & Gas Co., 5-21-41.

Column 8 applies to East and West Hackberry.

Column 9 applies to Caddo Parish, effective 10-15-41.

Column 9 applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22.41.

Column 1 applies to Reynolds lime, Jones sand, Schuler, Ark.

Column 2 applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

Column 3 applies to Olla.

Column 2 applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

Column 10 applies to Roanoke, Chalkley.

Column 11 applies to Iowa, Black Bayou, White Castle.

Column 12 applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

Column 13 applies to Lockport, Cameron Meadows, and West Gueydan, La.

Column 6 applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 3-19-42.

Column 1, Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.

Gulf Refining Co., 5-21-41.

Column 9, Jennings.

Column 8, Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, and Leesville.

Column 16 applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.12 for below 28° gravity.

Column 6 applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

Column 4 applies to West Gueydan, effective 5-25-42.

Pure Oil Co., 4-22-41.

Column 14 applies to Gueydan crude.

Column 6, Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

Column 6 applies to North Louisiana.

Columns 15 and 16, Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

Column 17, Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

Column 18, Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co.:	
Tepetate and Lake Arthur, 5-21-41	$1.18
Ville Platte, 5-22-43	1.30
Bear, 5-15-43	1.30
Gulf Refining Co., 5-21-41:	
Smackover (Ark.)	$0.83
Lion Oil Refining Co., 5-22-41:	
Smackover (heavy)	.83
Dorcheat	1.18
Phillips Petroleum Co., 5-22-41:	
Smackover (heavy)	$0.83
Placid Oil Co., 5-22-41:	
Tullos-Urania (5-21-41)	$1.18
Cotton Valley dist. (above 60°)	1.30
Cotton Valley (Holloway sand)	1.25
Cotton Valley (Bodcaw-D sands)	1.30
Pure Oil Co.:	
Bosco (5-21-41)	$1.14
Sweet Lake (5-22-41)	1.06
Creole (5-22-41)	1.16
Republic Oil Co., 6-2-41:	
Nevada County, Arkansas	$0.80
Republic Oil Refining Co., 5-21-41:	
Bayou Pigeon	$1.20
Shell Oil Co., Inc., 5-20-41:	
Happytown	$1.18
Standard Oil Co. of Louisiana, 5-22-41:	
Big Creek, Dorcheat, McKamie, Columbia, Macedonia (sour) (3-3-43)	$1.26
Smackover (heavy)	.83
Cotton Valley distillate (9-1-41)	1.40
Cotton Valley (Holloway sand)	1.25

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	...	...	...	...	...	...	...	...	...	...	...	...	$.94	...	...	...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	.96	...	...	...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	.98	...	...	...	...	...
Below 20	...	...	...	...	...	...	...	$1.06	...	$.94	$.99	$.80	...	...	$1.06	...	...	...
20-20.9	...	...	...	...	...	...	...	1.08	...	.96	1.01	.91	1.00	...	1.08	...	...	...
Below 21	$.88	...	...	$.90	...	...	...	...	...	...	...	...	...	$.90	...	...	...	...
21-21.9	.70	...	...	.92	...	...	...	1.10	...	.98	1.03	.93	1.02	.92	1.10	...	...	...
22-22.9	.72	...	...	.94	...	...	...	1.12	...	1.00	1.05	.95	1.05	.94	1.12	...	...	...
23-23.9	.74	...	...	.97	...	...	...	1.14	...	1.02	1.07	.97	1.08	.96	1.14	...	...	...
24-24.9	.76	...	...	.98	...	...	...	1.16	...	1.04	1.09	.99	1.11	.98	1.16	...	...	...
Below 25	...	$.86	$1.03	...	...	$.88	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	.78	.88	1.05	1.00	...	.90	...	1.18	...	1.06	1.11	1.01	1.14	1.00	1.18	...	...	...
26-26.9	.80	.90	1.07	1.02	...	.92	...	1.20	...	1.08	1.13	1.03	1.17	1.02	1.20	...	...	...
27-27.9	.82	.92	1.09	1.04	...	.94	...	1.22	...	1.10	1.15	1.05	1.19	1.04	1.22	...	...	...
28-28.9	.84	.94	1.11	1.06	...	.96	...	1.24	...	1.12	1.17	1.07	1.21	1.06	...	$1.14	$1.06	...
29-29.9	.86	.96	1.13	1.08	...	.98	...	1.26	...	1.14	1.19	1.09	1.23	1.08	...	1.16	1.08	...
30-30.9	.88	.98	1.15	1.10	$1.23	1.00	...	1.28	...	1.16	1.21	1.11	1.25	1.10	...	1.18	1.10	$1.05
31-31.9	.90	1.00	1.17	1.12	1.25	1.02	...	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	...	1.20	1.12	1.07
32-32.9	.92	1.02	1.19	1.14	1.23	1.04	...	1.32	1.09	1.20	1.25	1.15	1.29	1.14	...	1.22	1.14	1.09
33-33.9	.94	1.04	1.21	1.16	1.24	1.06	...	1.34	1.11	1.22	1.27	1.17	1.31	1.16	...	1.24	1.16	1.11
34-34.9	.96	1.06	1.23	1.18	1.26	1.08	...	1.36	1.13	1.24	1.29	1.19	1.33	1.18	...	1.26	1.18	1.13
35-35.9	.98	1.08	1.25	1.20	1.28	1.10	...	...	1.15	...	...	...	...	1.20	...	1.28	1.20	1.15
Below 36	...	...	...	...	...	...	$1.07	...	...	...	...	...	...	...	...	...	...	...
36-36.9	1.00	1.10	1.27	1.22	1.40	1.13	1.09	...	1.17	...	...	...	...	1.22	...	1.30	1.22	1.17
37-37.9	1.02	1.12	1.29	1.24	1.42	1.14	1.11	...	1.19	...	...	...	...	...	...	...	...	1.19
38-38.9	1.04	1.14	1.31	1.26	1.44	1.16	1.13	...	1.21	...	...	...	...	...	...	...	...	1.21
39-39.9	1.06	1.16	1.33	1.28	1.46	1.18	1.15	...	1.23	...	...	...	...	...	...	...	...	1.23
40 and above	1.08	1.18	1.35	1.30	1.48	1.20	1.17	...	1.25	...	...	...	...	...	...	...	...	1.25

Lisbon distillate	$1.20
Texas Co., 5-21-41:	
Erath	$1.21
Garden Island	1.36
Lafitte, Paradis	1.19
Lake Mongoulois	1.36

CANADIAN FIELDS

Imperial Oil, Ltd.:	
Petrolia, 11-6-39	$2.10
Oil Springs, 11-6-39	2.07
Bothwell, 11-6-39	2.10
Turner Valley, 7-16-41	$1.35-1.97

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH TEXAS AND SOUTHWEST TEXAS TABLE EXPLANATION

Column 1 Mirando:
Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41, includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco, Driscoll, O'Hern, Piedra Lumbre, and Tarancahuas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

Column 2 Refugio:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.

Column 3 Refugio:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

Column 4 La Rosa:
American Mineral Spirits Co., 3-29-41.

Column 5 Duval-Mirando:
Sun Oil Co., 5-21-41.

Column 6 Duval-Mirando:
Texas Co., 5-21-41.

Column 7 Nueces County:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8	9
Below 20	....	....	....	....	$0.80	....	....	....	$0.80
20-20.9	....	....	....	....	.82	....	....	....	.82
Below 21	....	....	....	....	....	$0.85	....	....	....
21-21.9	....	....	....	....	.84	.87	....	....	.84
22-22.9	....	....	....	....	.86	.89	....	....	.86
23-23.9	....	....	....	....	.88	.91	....	....	.88
24-24.9	....	....	....	....	.90	.93	....	....	.90
Below 25	....	....	$0.88	....	....	....	$0.89	$0.95	....
25-25.9	$0.95	....	.90	$0.97	.92	.95	.91	.97	.92
26-26.9	.97	....	.92	.99	....	.97	.93	.99	.92
27-27.9	.99	....	.94	1.01	....	.99	.95	1.01	.92
28-28.9	1.01	$1.01	.96	1.03	....	1.01	.97	1.03	.92
29-29.9	1.03	1.03	.98	1.05	....	1.03	.99	1.05	.92
30-30.9	1.05	1.05	1.00	1.07	....	1.05	1.01	1.07	.92
31-31.9	1.07	1.07	1.02	1.09	....	1.07	1.03	1.09	.92
32-32.9	1.09	1.09	1.04	1.11	....	1.09	1.05	1.11	.92
33-33.9	1.11	1.11	1.06	1.13	....	1.11	1.07	1.13	.92
34-34.9	1.13	1.13	1.08	1.15	....	1.13	1.09	1.15	.92
35-35.9	1.15	1.15	1.10	1.17	....	1.15	1.11	1.17	.92
36-36.9	1.17	1.17	1.12	1.19	....	1.17	1.13	1.19	.92
37-37.9	1.19	1.19	1.14	1.21	....	1.19	1.15	1.21	.92
38-38.9	1.21	1.21	1.16	1.23	....	1.21	1.17	1.23	.92
39-39.9	1.23	1.23	1.18	1.25	....	1.23	1.19	1.25	.92
40 and above	1.25	1.25	1.20	1.27	....	1.25	1.21	1.27	.92

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

Column 1 West Central and North:
Humble Oil & Refining Co., 5-22-43, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 5-22-43, in Leuders area.
Gulf Refining Co., 5-22-43.
Sinclair Prairie Oil Marketing Co., 5-22-43.

Column 2 North Texas:
Continental Oil Co., 5-22-43.
Magnolia Petroleum Co., 5-22-43.
Panhandle Refining Co., 5-22-43.
Bell Oil & Gas Co., 5-22-43.
Texas Co., 5-22-43.

Column 3 East Central:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.
Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

Column 4 East Central:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

Column 5 East Central:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

Column 6 North Texas:
Stanolind Oil Purchasing Co., 5-22-43.

Column 7 Fisher County:
Shell Oil Co., Inc., 12-11-41.

Column 8 Mexia:
Sinclair Prairie Oil Marketing Co., 5-30-41

Column 9 Talco:
Magnolia Petroleum Co., 5-28-43.
Humble Oil & Refining Co., 5-28-43.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41	$1.35
Agua Dulce (heavy), 10-16-41	$1.35
Republic Oil Refining Co., 5-21-41.	
Alfred and Magnolia City	$1.25
Continental Oil Co., 5-21-41.	
Alice, Benavides (North Sweden), Ben Bolt, Clark-Mull, Sun, and Tom Graham	$1.30
Humble Oil & Refining Co., 5-21-41.	
Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou	$1.20
Sun Oil Co., 5-21-41.	
Cass County	$1.20
Texas Co., 5-21-41.	
Cayuga, Anderson County	$0.90
Pan American Production Co., 5-21-41.	
Chapel Hill, Smith County:	
Crude distillate	$1.20
Crude oil	1.18
Chapel Hill Gas System, 11-7-41.	
Clay Creek, Washington County	$1.00
Sun Oil Co., 5-21-41.	
Cleveland, Liberty County	$1.20
Magnolia Petroleum Co., 5-21-41.	
Conroe, Montgomery County	$1.43
Humble Oil & Refining Co., 5-21-41.	
Tide Water Associated Oil Co., 5-21-41.	
Sun Oil Co., 5-21-41.	
Texas Co., 5-21-41.	
Cotton Lake (South)	$1.20
Sun Oil Co., 5-21-41:	
East Texas and Flag Lake*	$1.20
*Humble Oil & Refining Co., 5-21-41.	
Pan American Production Co., 5-21-41.	
Tide Water Associated Oil Co., 5-21-41.	
Gulf Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
Sinclair Prairie Oil Marketing, 5-21-41.	
Shell Oil Co., Inc., 5-20-41.	
Sun Oil Co., 5-21-41.	
Texas Co., 5-21-41.	
Stanolind Oil Purchasing Co.	
Esperson (35° and above), South Esperson	$1.20
Sun Oil Co., 5-21-41.	
Flour Bluff, East Flour Bluff	$1.23
Humble Oil & Refining Co., 5-21-41.	
Hockley and Cochran	$0.97
Texas Co., 5-21-41.	
Livingston and Mercy	$1.20
Shell Oil Co., Inc., 5-20-41.	
Long Lake	$1.23
Sinclair Prairie Oil Marketing, 5-21-41.	
Luby	$1.20
American Mineral Spirits Co., 5-21-41.	
Luling	$1.00
Magnolia Petroleum Co., 5-21-41.	
Lytton Springs	$1.17
Magnolia Petroleum Co., 5-21-41.	
Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski	$1.41
Humble Oil & Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
*Texas Co., 5-21-41.	
Rincon (North), Sun, North Sun and Garcia	$1.20
Sun Oil Co., 5-21-41.	
Yturria	$1.43
Sun Oil Co., 3-19-42.	
Talco	$0.79
Humble Oil & Refining Co., 5-21-41.	
Magnolia Petroleum Co., 5-21-41.	
Tomball and Satsuma	$1.40
Humble Oil & Refining Co., 5-21-41.	
*Magnolia Petroleum Co., 5-21-41.	
Stanolind Oil Purchasing Co., 4-1-41.	
Van, Van Zandt County	$1.00
Humble Oil & Refining Co., 5-21-41.	
Pure Oil Co., 5-21-41.	
Yates (regular)	$0.90
Humble Oil & Refining Co., 5-21-41.	
Gulf Refining Co., 5-21-41.	
Shell Oil Co., Inc., 5-20-41.	
Yates (shallow)	$0.83
Shell Oil Co., Inc., 5-20-41.	

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$0.96	$0.99
20-20.9	1.06	1.06	....	1.00	.99
Below 21	....	....	$1.06	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

Column 1:
Humble Oil & Refining Co., 5-21-41, in-

cludes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompson, Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

Column 2:

Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

Column 3:

Pan American Production Co., 5-21-41, includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

Column 4:

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

Pure Oil Co., 2-23-43, at Alief field.

Column 5:

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

Continental Oil Co., 6-16-43.*

Phillips Petroleum Co., 6-16-43.*

*Starts at $1 for 29-29.9.

Column 5 Winkler and Lea:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

Column 6 Gray County:

Texas Co., 6-16-43.

H. F. Wilcox Oil & Gas Co., 6-16-43.

Column 7 Lea County:

Magnolia Petroleum Co., 5-21-41.

Column 8 Eddy County:

Continental Oil Co., 5-30-41.

Column 9:

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

Column 10 Texas Panhandle:

Humble Oil & Refining Co., 6-16-43.

Gulf Refining Co., 6-16-43.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co. 6-16-43.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.80	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.82	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.84	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.86	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.88	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.90	....
Below 25	....	$0.80	....	....	....	....	$0.80	....	....	....	$0.90
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.92	.92
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.94	.94
27-27.9	.86	.86	.86	....	.86	....	.86	....	.86	.96	.96
28-28.9	.88	.88	.88	$0.86	.88	....	.88	$0.88	.88	.98	.98
29-29.9	.90	.90	.90	1.00	.90	....	.90	.90	.90	1.00	1.00
30-30.9	.92	.92	.92	1.02	.92	....	.92	.92	.92	1.02	1.02
31-31.9	.94	.94	.94	1.04	.94	....	.94	.94	.94	1.04	1.04
32-32.9	.96	.96	.96	1.06	.96	....	.96	.96	.96	1.06	1.06
33-33.9	.98	.98	.98	1.08	.96	....	.98	.96	.98	1.08	1.08
34-34.9	1.00	1.00	1.00	1.10	1.00	1.10	1.00	1.00	1.00	1.10	1.10
35-35.9	1.02	1.02	1.02	1.12	1.02	1.12	1.02	1.02	1.02	1.12	1.12
36-36.9	1.04	1.04	1.04	1.14	1.04	1.14	1.04	1.04	1.04	1.14	1.14
37-37.9	1.06	1.06	....	1.16	1.06	1.16	....	1.06	....	1.16	1.16
38-38.9	1.08	1.08	....	1.18	1.08	1.18	....	1.08	....	1.18	1.18
39-39.9	1.10	1.10	....	1.20	1.10	1.20	....	1.10	....	1.20	1.20
40 and above	1.12	1.12	....	1.22	1.12	1.22	....	1.12	....	1.22	1.22

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

Column 1:

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

Stanolind Oil Purchasing Co., 5-1-43, at Slaughter and Cedar Lake.

Column 2:

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41, in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

Column 3:

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

Column 4 Texas Panhandle:

Magnolia Petroleum Co., 6-16-43.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co. 6-16-43.

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
- National lines, 3-26-42 ..... $3.00
- Southwest Penn, 3-26-42 ..... 2.88
- Eureka lines, 3-26-42 ..... 2.59
- Corning grade, 5-27-41 ..... 1.31

Tide Water Associated Oil Co.:
- Bradford, 3-26-42 ..... $3.00
- Allegany, N. Y., 3-26-42 ..... 3.00

Pennzoil Co.:
- Group A, 3-26-42 ..... $2.93
- Group B, 3-26-42 ..... 2.93
- Group C, 3-26-42 ..... 2.91
- Group D, 3-26-42 ..... 2.90
- Group E, 3-26-42 ..... 2.86

Quaker State Oil Refining Corp.:
- In Buckeye lines, 3-26-42 ..... $2.58
- In Eureka lines, 3-26-42 ..... 2.59

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
- Big Sandy River (8-9-43) $1.43
- Kentucky River (6-19-41) 1.43

Sohio Corp., 5-21-41:
- Birk City $1.33

Western Kentucky

All purchasers, 8-9-43:
- Henderson, Webster, McLean, Daviess, Union and Muhlenberg counties $1.37
- Butler County 1.32
- Bowling Green area 1.17

West Virginia

Pure Oil Co.:
- Cabin and Kelly Creek, 3-27-42 ..... $2.50

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
- Illinois basin, 5-21-41 ..... $1.37
- Eastern Illinois, 5-21-41 ..... $1.33
- Western Indiana, 5-21-41 ..... 1.33

Magnolia Petroleum Co.:
- Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:

STANDARD OIL CO. OF CALIFORNIA CRUDE-OIL PRICES EFFECTIVE APRIL 1, 1943

Gravity	Signal Hill (Long Beach)	Wilmington	Seal Beach	Huntington Beach	Inglewood	Olinda-Brea Canyon	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills, Midway-Sunset, Lakeview area	Coalinga	Kettleman Hills	Elwood Terrace
14-14.9	....	$0.93	....	$0.96	....	$0.95	$0.95	$0.95	$0.95	$0.97	....	....	....	....	....	$0.98	$0.98	....	....
15-15.9	....	.96	....	1.00	$1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
16-16.9	....	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
17-17.9	....	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
18-18.9	$0.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
19-19.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	$0.98	.98	.98	....	....
20-20.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
21-21.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
22-22.9	.96	.98	$0.88	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
23-23.9	1.00	1.02	.92	1.02	1.01	.98	.97	.98	1.00	.97	....	....	....	....	.98	.99	.98	....	....
24-24.9	1.03	1.06	.97	1.05	1.04	1.01	1.01	1.02	1.03	.97	$0.99	....	....	....	.98	1.03	.98	....	....
25-25.9	1.07	1.09	1.01	1.08	1.07	1.04	1.05	1.06	1.07	.98	1.03	....	....	....	.98	1.07	.98	....	....
26-26.9	1.11	1.12	1.06	1.11	1.10	1.08	1.09	1.10	1.11	1.01	1.06	....	....	....	.98	1.11	.98	....	....
27-27.9	1.15	1.15	1.10	1.14	1.14	1.11	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	.98	....	....
28-28.9	1.18	1.18	1.15	1.17	1.17	1.14	1.17	....	....	1.08	1.13	1.06	....	....	1.04	1.19	1.00	....	....
29-29.9	1.20	1.21	1.19	1.20	1.20	....	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.02	....	....
30-30.9	1.23	1.24	....	1.23	1.23	....	....	....	....	1.15	1.21	1.15	$1.01	$1.00	1.10	1.28	1.04	....	f.o.b.
31-31.9	....	....	....	....	1.24	....	....	....	....	1.19	1.24	1.19	1.04	1.13	1.14	....	1.06	....	ship
32-32.9	....	....	....	....	....	....	....	....	....	1.23	1.26	1.23	1.07	1.14	1.17	....	1.09	....	....
33-33.9	....	....	....	....	....	....	....	....	....	1.27	....	1.26	1.10	1.17	....	....	1.11	....	$1.23
34-34.9	....	....	....	....	....	....	....	....	....	1.31	....	1.30	1.13	1.20	....	....	1.13	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	$1.23	1.28
36-36.9	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....

Standard posts 94 cents for 12 gravity and 96 cents for 13 gravity in San Joaquin fields, effective May 25, 1943.

Illinois (Louden), 8-21-41	$1.37
Sohio Corp.:	
Illinois basin, 8-21-41	$1.37
Texas Co.:	
Illinois basin, 8-21-41	$1.37
Gulf Refining Co.:	
Illinois basin, 8-21-41	$1.37

Michigan

Simrall Corp., 8-27-41:	
Greendale, Porter, Vernon, Crystal, and Wise	$1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet)	1.43
Freeman, Redding, Lincoln and Winterfield	1.39
Hamilton-Grout	1.39
West Branch-Arenac	1.34
Sohio Corp., 8-1-41:	
Bloomingdale-Columbia	$1.45
Mid-West Refineries, Inc., 8-1-41:	
Kent County	$1.38
Pure Oil Co., 8-27-41:	
Sherman	$1.39
Midland (Midland County)	1.44

ROCKY MOUNTAIN GRAVITY TABLE

Below 29	$0.96
29-29.9	.98
30-30.9	1.00
31-31.9	1.02
32-32.9	1.04
33-33.9	1.06
34-34.9	1.08
35-35.9	1.10
36-36.9	1.12
37-37.9	1.14
38-38.9	1.16
39-39.9	1.18
40 and above	1.20

Stanolind Oil & Gas Co., 8-20-41, includes Dutton Creek, Midway, and Salt Creek except Tensleep crude, Wyoming.

Sinclair-Wyoming Oil Co., 8-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 8-21-41, includes Fort Collins and Wellington, Colorado.

Wyoming

Ohio Oil Co.:	
Rock River (8-20-41)	$1.10
Lance Creek (7-1-41)	1.12
Elk Basin and Grass Creek (light)	1.00
Elk Basin (heavy) (4-28-43)	.90
Grass Creek (heavy) (4-1-43)	.85
Stanolind Oil & Gas Co.:	
Frannie (light) (4-1-43)	$0.85
Frannie (heavy) (4-1-43)	.82
Grass Creek (light) (5-20-41)	1.00
Grass Creek (heavy) (4-1-43)	.85
Elk basin (5-20-41)	1.00
Salt Creek (Tensleep) (4-28-43)	.90
Contunental Oil Co.:	
Big Muddy (5-30-41)	$1.08
Lance Creek (9-1-41)	1.12

Montana

Continental Oil Co., 4-1-41:	
Cat Creek	$1.15

Colorado

Stanolind Oil & Gas Co., 8-20-41:	
Iles	$1.07
Continental Oil Co., 8-21-41:	
Canon City-Florence	$1.05

CALIFORNIA

McClung, Kern County, Wildcat Ready for Test

LOS ANGELES, Calif.—Continental Oil Co. has landed casing in 1-G Kern County Land in the McClung district of Kern County, a few miles southeast of the Greeley field, and should make a production test within the next week. The company would have preferred to land a solid string of pipe in this wildcat and then perforate opposite the Stevens oil sand, but the pipe froze just above the sand and the company decided to cement the string and run a liner. This wildcat was carried down to 8,134 ft. but has been plugged back to 7,502 ft. On a formation test made a short time ago at 7,462 to 7,540 ft., gas hit the surface in 5 minutes and fluid reached the top in approximately 20 minutes. On this short test the well flowed at a daily rate of 500 bbl. of 30-gravity oil but when the tester was pulled the recovery was 940 ft. of salt water. It will be noted that the effective depth at present, 7,502 ft., is above the lower part of the hole included in the formation test. Three thin sands were found in this wildcat and on the basis of formation test the company may possibly have found a new productive area.

Union Oil Co. has moved in 3 miles southwest of the Rio Bravo field, located immediately northwest of the Greeley field, and will drill a wildcat on property leased from Kern County Land Co. in 8-29s-25e to Stevens sand. Union has also started a test about 2 miles southeast of the Lost Hills field in Kern County, but this will be a comparatively shallow hole.

Projected drilling.—Drilling operations appear to be continuing at about the rate prevailing for the past several months. A recent survey showed a large number of undrilled locations and as soon as material and labor is provided they will be developed. Standard Oil Co. of California staked location for 73 new wells and with other operators staked a total of 97 new locations during the week. Of Standard's new locations, 9 are at Huntington Beach, 17 are in the Montebello field, 17 are in the East Coalinga field, 16 are in the Kern Front field and 14 were in the Midway-Sunset field. Belridge Oil Co. staked locations for seven new wells to be drilled in the South Belridge field on fee-owned acreage, Long Beach Oil Development Co. staked locations for 11 new wells to be drilled in the Wilmington field, and Union Pacific Railroad Co. made locations for six new wells in the same field. All these locations are in addition to wells already spudded and are not scheduled to be drilled simultaneously as there are not 97 inactive crews available for work. In addition to staking this large number of new locations, Standard filed notice of intention to salvage casing from a number of old wells in the Midway-Sunset field. Standard has been occupied with this salvage work for the past 2 years in order to provide current tubular requirements.

Fresno County.—Shell is just about ready to begin drilling on a test in 10-15s-17e and which will be known as 1-1 San Joaquin. The location is approximately 1½ miles northwest of the discovery well in the West Raisin City field, drilled as a joint undertaking by Seaboard Oil Co., Union Oil Co. and Tide Water Associated Oil Co.

Universal Consolidated Oil Co. is drilling a water well in 14-15s-17e preliminary to drilling a test southeast of discovery well in the West Raisin City field. Seaboard has finished digging pit for 31-14, the second joint project with Union and Tide Water Associated. Southeast of the East Raisin City field, Petrol Corp. has made tentative location for a test to be drilled in 29-15s-18e about 1½ miles southeast of Shell's discovery well in the East Raisin City field.

Pleasant Valley and Coalinga.—R. S. Lytle has succeeded in securing a satisfactory water shutoff in 86-20-F, the most northerly drilling well in the Pleasant Valley field, and is drilling in Gatchell sand of Eocene age, the productive zone in this field. This well, the highest structurally to be drilled to date, should be ready for a production test within the next week or 10 days. The water problem encountered in this well was somewhat surprising and may explain why Standard's 62-29-F, only a short distance of the discovery well, proved unproductive. Standard may go back into this well in the light of what has been found by Lytle to the north. Standard's location of 1-28-F in the northwest corner of Section 28 tends to indicate that operators in this field may proceed with future development on the basis of one well to 20 acres in contrast with drilling to date which has been on a 40-acre spacing program.

Fresno County wildcats.—Standard is preparing to resume drilling operations in 1 Bordieau, a wildcat about 2 miles north of the northwest end of the Kettleman North Dome field after landing surface pipe at 592 ft. This wildcat is on a 320-acre lease and consists of the south half of Section 1-21s-16e. The test is being drilled to the Temblor but may be carried down to the Eocene.

Texas Co. has staked location for a wildcat to be drilled about 1 mile east of the center of the Coalinga Nose field and probably will test the Gatchell zone.

LOS ANGELES BASIN

Huntington Beach.—Jones sand development is continuing in the Huntington Beach field. Top of the Jones sand is encountered at approximately 2,500 ft. in these directionally drilled wells and in some wells it is possible to take in about 500 ft. of oil sand. In addition to the nine locations staked at Huntington Beach by Standard, Signal Oil & Gas Co. has locations staked for three additional wells to be drilled on the Bolsa lease and Southwest Exploration Co. has a like number which will be drilled to the Jones sand beneath the tideland. Southwest Exploration has a number of locations available in the first line north of the Pacific Electric tracks.

Los Angeles County.—Barnsdall Oil Co. has plugged back 1 Baldwin in the Whittier district from 2,983 ft. to 2,447 ft. and is preparing to test showings found at 2,400-47 ft. in either basal Pliocene or upper Miocene. This

(Continued on Page 106)

OHIO, KENTUCKY

Oriskany Play Developing In Southeast Ohio

ZANESVILLE, Ohio.—Three wildcats were completed this week, all dry.

The largest leasing play at this time is in Washington, Monroe, and Belmont counties. A solid block of acreage extending across the three counties has been leased and two wells are expected to start soon. A number of major oil companies hold acreage as well as Ohio and West Virginia companies. The play is for the Oriskany sand and is taken on the same subsea as the prolific Oriskany field of West Virginia. Other blocks of acreage are being taken in northeastern Ohio for Newbury and Clinton tests.

OHIO WILDCAT COMPLETIONS

Licking County, Hanover Township: Industrial Gas 1 Albert Stasel, Lot 6, Clinton, 2,687-2,733 ft., dry, T.D. 2,743 ft.

Medina County, Liverpool Township: Ohio Fuel 1 H. S. Herold, Sec. 5, Clinton 2,924-60 ft., dry, T.D. 3,012 ft.

Perry County, Harrison Township: Kenova 1 Emmett McNutty, Sec. 36, Clinton 3,544-84 ft., dry, T.D. 3,585 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—W. R. Walters and Oil Carriers, Inc., opened a new pool in Webster County with their 1 Cokes-Melton wildcat, which started at 105 bbl. per day from Waltersburg sand at 1,839-53 ft. and Tar Springs sand at 1,963-69 ft., total depth 1,978 ft. In the same county, White et al 1 H. Z. Clark, near Clay, was reported with a good showing of oil in the Palestine at 1,233-35 ft.

Kingwood Oil Co. and Duncan and Jablonski drilled a dry hole at 2,728 ft. in Union County. The well was 1 Betty Deacon, 3 miles north of Uniontown, a wildcat. Another outpost Trans-Tex Oil Co. 1 Mary Burbank, 5 miles west of Spring Grove, Union County, was dry at 2,929 ft.

Six wells were completed in Henderson County, 3 oil wells and 3 dry holes,.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Henderson County: A. J. Slagter, Jr. 1 T. J. Connelly, 1 mi. N of Spottsville, dry at 2,312 ft.

Webster County: W. R. Walters and Oil Carriers 1 Cokes-Melton, pumped 105 bbl. Waltersburg sand at 1,839-53 ft. and Tar Springs sand at 1,963-69 ft.

Union County: Kingwood, Duncan and Jablonski 1 Betty Deacon, 3 mi. N of Uniontown, dry at 2,728 ft. Benoist sand 2,432 ft. Renault 2,486 ft. Ste Genevieve 2,549 ft., Fredonia 2,592 ft. St. Louis 2,722 ft.

Trans Tex 1 Mary Burbank, 5 mi. W of Spring Grove, dry at 2,929 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Eastern Kentucky operations, after a slight upturn last week, moved on a more general level this week with field reports showing one completion.

West Virginia Gas Co. has completed well No. 5,469 on the Greenville Charles tract in Pike County at a total depth of 1,940 ft. in Maxon. The well has an open flow of 520,000 cu. ft. of gas daily.

INDIANA

EVANSVILLE, Ind.—A. C. Thomas, Bennett Bros. and E. E. Beatty have opened a pool in Posey County, 4 miles from other production, with their 1 Bailey, NW SW SE 28-4s-13w. The well was not yet a completion but on an 8-hour swabbing test produced 5½ bbl. per hour, with a showing of water from Waltersburg sand at 2,194-2,207 ft. It was being prepared for pumping. The location is 3 miles northeast of New Harmony.

Three oil wells and two dry holes were completed in the state during the week, all of them in established fields.

CANADIAN FIELDS

Oil-Shale Development Planned for James Bay Area

CHATHAM, Ont.—The Moose River basin in the James Bay area of northern Ontario, for many years regarded as a potential major oil area, will be tested by MacDyke Oil & Mining Industries, Ltd., of Toronto. The company controls an area of approximately 9 square miles, known to contain extensive oil-shale deposits, with good possibilities of free oil. The area selected for immediate exploration is one lending itself to economical operation, particularly in regard to transportation.

The commercial development now being undertaken follows a preliminary exploration campaign on a comprehensive scale. The area has already been reported upon by geologists of the Dominion Ontario governments. The areas which these geologists found of particular interest were the oil-shale deposits outcropping on the Abitibi River in Hobson Township and along the Mattagami River in Hecla Township. A report made for the federal Mines Department some years ago regards the Abitibi River location as the more favorable, and this has been confirmed by preliminary exploratory work conducted recently by the Macdyke Prospecting Syndicate, whose operations are being taken over by the new company.

According to a recent report by Louis Whitman, consulting engineer for the company, the product so far proven to be of the greatest importance in regard to tonnage and commercial possibilities is the oil shale, which has been cross-sectioned by diamond-drilling 10 holes along the T. & N. O. right-of-way, from mileage 112 to 114, and partly explored by drilling holes 11 and 12 along the west bank of the Abitibi River, a mile east of the railway. All the first 10 holes gave intersections of the black-oil shales to an average depth of 60 ft., sealed, above and below, by a considerable thickness of blue clay, impervious to water. On the west bank of the Abitibi River, in Hole 12, oil shales were intersected between 108 and 326 ft., a thickness of 218 ft. with full recovery of core, and a flow of gas and water saturated with oil was encountered at 700 ft., forced up by fairly strong hydraulic pressure. Hard rock, possibly a capping formation, was met between 745 and 765 ft. at which point the drilling was stopped, casing being left in the hole for possible future operations.

Contemplated operations include extensive and systematic drilling for free oil, and the development also of the known oil-shale deposits, which, in addition to the usual petroleum products will yield numerous valuable byproducts, such as ammonium sulphate, carbolic acid, toluene and picric acid, salicylic acid, benzene, wax and butane. Operations will be supervised by Mining Research Corp., Ltd., as consulting engineers. R. E. Holliday, geologist for Mining Research, and W. Dykes, president of the MacDyke company, are now on the ground planning the development. The drilling depth at which oil should be encountered is estimated at around 1,500 ft.

Southwest Turner Valley. — In the southwest Turner Valley extension, Imperial-Hudson's Bay 15, LSD 1, 8-18-2w5, finished at 8,252 ft. with Madison limestone at 7,798 ft. has developed one of the largest wells in the field, with a natural flow, before acidizing of 70 to 75 bbl. an hour, or around 1,800 bbl. a day. The test got the black lime at 8,241 ft. with no evidence of the usual lower porous zone, but the upper porous from 7,910 to 8,048 ft. showed unusually heavy oil saturation. After a succession of runs had repeatedly filled all available storage, the well settled to about 55 bbl. an hour. Additional tankage is being provided and the lime is being acidized preliminary to official tests for allowable.

The strike is expected to divert attention to the previously neglected south end of the field. This area, for some years considered hopeless on account of faulted conditions, has been systematically tested by Imperial Oil in conjunction with the Hudson's Bay Co., a succession of joint tests having been drilled in 8-18-2w5. Imperial-Hudson's Bay 15 is the most southeasterly location in the section. It is more than ¼ mile north and east of Brown Oil Corp. 6, LSD 15, 5-18-2w5, which got the lime at 8,458 ft. and discontinued drilling at 8,650 ft. without reaching the lower porous. Brown 6 had an initial production of 192 bbl.

(Continued on Page 106)

SOUTHWEST TEXAS

New Pool Opened Near La Capita, Starr County

CORPUS CHRISTI, Tex.—Continental Oil Co.'s Starr County wildcat 1 William Cameron, 3 miles southwest of La Capita, one of two tests which have been the center of active lease and royalty trading in the Rio Grande Valley for several weeks, is now rated as a pool opener. With total depth of 5,005 ft., plugged back to 4,160 ft., 2-in. tubing was swung at 4,126 ft. On a 24-hour test the well flowed 225 bbl. of oil through ⅛-in. choke, with perforations at 4,140-50 ft. Tubing pressure was 900 lb. and shut-in casing pressure 1,300 lb. Gas-oil rate was 736. The well, at last report, was waiting for potential test.

In Willacy County, at the eastern extremity of the valley, which also is witnessing a brisk lease and royalty play, Texas Co. 1 Yturria Land & Livestock Co., 5 miles northeast of Yturria, was at total depth of 6,500 ft. in shale and running an electrical survey. Projected depth of this wildcat is 10,000 ft. In Hidalgo County, adjoining Willacy on the west, Texas, after plugging back to straighten the hole, which had gone off vertical, was drilling below 5,670 ft. at 1 American Investment Corp. This wildcat is 6 miles northwest of Mission. In the same county Seaboard Oil Co. was drilling at 5,958 ft. in shale at 2 Boston-Texas Land Trust Co., 5 miles east of the Rincon field.

Zapata County.—Texas was still swabbing fresh water with a trace of oil at 2 Hartman, 5 miles west of Guerra. George Echols et al was drilling at 1,365 ft. in hard shale at 1 Volpe, in Porcion 32.

LOWER GULF COAST WILDCAT COMPLETIONS

Willacy County: Sinclair Prairie Oil Co. 1 C. E. Wertz, 1 mi. E of Raymondville, dry at 8,519 ft.

SOUTH TEXAS WILDCAT COMPLETIONS

Jim Hogg County: Sun 1-C S. K. East, 4 mi. NE of Randado, dry at 4,075 ft.

Starr County: T. E. Stephens 1 E. Gonzales, 2 mi. E of Buuena Vista, dry at 2,248 ft.

Sun 1 P. L. Salinas (second hole), 2 mi. SE of North Sun field, dry at 7,505 ft.

Zapata County: Texas 3 Bert Hartman, 5 mi. W of Guerra, dry at 2,345 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Bell County: R. B. Roberts Co. 1 Ed Heuss, 3 mi. NW of Killeen, dry at 913 ft.

Travis County: W. O. Caffey 1 Acklin, 1 mi. S of Manor, dry at 750 ft.

Williamson County: G. C. Richardson Co. 1 M. Sorrenson, 2 mi. NE of Round Rock, dry at 1,002 ft.

O. A. Stubbs et al 1 Minnie Carlson, 1½ mi. SE of Round Rock, dry at 752 ft.

NORTH LOUISIANA

PAW Revises Drilling Plan In Arkansas Oil Pool

SHREVEPORT, La.—The Stephens-Smart field of Columbia, Nevada and Ouachita counties, and which has long been one of the most active spots in Arkansas, had a new drilling program outlined which would add some 60 new wells to the field. New spacing permits would allow 2 wells on 40 acres and any well can be drilled within 30 ft. of the center of any 10 acres, but at least 450 ft. from any other drilling or producing well. This order was issued by Ralph K. Davies, deputy administrator of PAW.

MISSISSIPPI

JACKSON, Miss. — Gulf Refining Co. has staked location for two southern Mississippi wildcats. One, in Jefferson County, is 1 Ella Cato, 30-8n-4w. The other, in Jefferson Davis County, is 1 W. J. Price, 19-7n-17w.

California Co., it is reported, is planning to test its 1 National Gasoline Co. of Louisiana, Inc., in the Wilcox formation. This wildcat, 16 miles of Natchez, in Adams County, flowed 6½ bbl. of distillate an hour in a re-

(Continued on Page 106)

STROM STEEL BALLS

Serving the Oil-Well Industry

As an integral part of rotary tables, working barrels, rock drills and swivels in derrick assemblies, Strom Steel Balls are serving in the all-out production effort of the oil and gas industry.

Strom STEEL BALL CO.
1850 South 54th Avenue • Cicero, Illinois

Changed your ADDRESS?

If you have moved and have not notified THE OIL AND GAS JOURNAL, please use this form so we can get your copies to you promptly.

NAME .....
OLD ADDRESS .....
.....
NEW ADDRESS .....
.....
COMPANY ..... TITLE .....

Mail to: Circulation Department
The Oil and Gas Journal Tulsa, Oklahoma

5 REASONS WHY Drillers Like FESCO JEL

Fesco Jel—Schundler's Bentonite Colloidal Drilling Clay, offers many advantages to Drillers. For example:

1—Lessens abrasion. It surrounds sharp-edged particles of sand and grit with colloidal jel.

2—Eliminates corrosion. Coats exposed metal surfaces with an inert colloidal film.

3—Avoids mud loss. Deposits an impervious film of jel on the walls of the hole.

4—Offers high suspending qualities. Prevents weight material from settling out in the mud ditch.

5—Reduces caving. Penetrates loose formations, surrounds particles with mud which soon reverts to a stiff plastic jel.

Fesco Jel, stocked at many locations, offers the driller still further advantages. Write today for complete technical information.

F. E. SCHUNDLER & CO., INC.
530 RAILROAD ST.
JOLIET,
ILLINOIS

Schundler

ENGINEERED FOR PRESENT DAY DRILLING NEEDS . . .

BREWSTER

Oilbath

ROTARIES

12" - 18" - 22" - 26" Sizes

- Full Table Opening
- Slushproof Bearings
- Ample Oil Reservoirs
- Machine Cut, Heat Treated Gears

THE BREWSTER COMPANY, INC.

Shreveport, Louisiana, U.S.A.

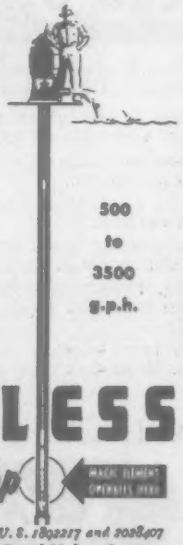
FOR EXPORT: Acme Well Supply Co. 19 Rector Street, New York City

Brewster proudly flies the Army-Navy "E" Flag, awarded for high achievement in war production.

"You can't squeeze water uphill"

so

PEERLESS did it!



The unconventional pump that has upset America's hide-bound water-raising "traditions."

500 to 3500 g.p.h.

PEERLESS

HI-LIFT *Pump*

Licensed under Moineau Pat. U. S. 1892217 and 2028407

Peerless Pump Div. • Food Mchy. Corp.
301 West Avenue 26, Los Angeles 31, Calif.
Factories:
Los Angeles, San Jose, Fresno, Calif.; Canton, Ohio

Among the Drilling Contractors

C. I. Drilling Corp., Houston, Tex., has set surface pipe at 6-A Schlicher-Thomas Co., which it is drilling for Gulf Refining Co. in the Pine Prairie field, Evangeline Parish, Louisiana.

W. P. Taylor Drilling Co., Houston, Tex., last week spudded 3 Leveridge for H. C. Cockburn, in the East Bernard area of Wharton County, Texas. Taylor recently completed 2 Leveridge, a gas well in the J. Scott Survey, Wharton County, for Mr. Cockburn. This was a wildcat test.

O. W. Dyer, Houston, Tex., was rigging up last week at 1 Maude Harding, southwest of Sweeny, in the Old Ocean field, Brazoria County, Texas, to be drilled for Tide Water Associated Oil Co.

Lon H. Cron, Houston, Tex., started work last week on 22-B Driscoll for Continental Oil Co. in the Driscoll field, Duval County, Texas. The contractor set surface pipe for 1 Birdie Porter, in the Porter field, Karnes County, for Continental.

Wynn Crosby Drilling Co., Houston, Tex., has spudded 1 Roberts, which it will drill for Providence Oil Co. in the Clodine field, Fort Bend County, Texas. This contracting company, with Kirby Petroleum Co., will drill a wildcat, 1 Canada and Smith ranch, in the Jackson Pasture area of Chambers County.

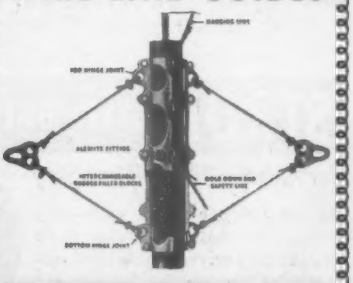
Brewster-Bartle Drilling Co., Houston, Tex., is moving in for 1 Dee McElroy, a wildcat to be drilled for the Humble Oil & Refining Co. in the Hope area of Lavaca County, Texas, 4 miles south of Ezzell. It is below 6,500 ft. at 1 Barnes, a wildcat 1 mile southeast of Fannett, in Jefferson County, for Texas Co. Projected depth is 9,500 ft. In the North Markham field, Matagorda County, Brewster-Bartle was completing 6 Braman at 8,100 ft. for Sun Oil Co. It was below 9,300 ft. at 1-A J. E. Pierce estate, ½ miles northeast of Blessing, in Matagorda County, for Ohio Oil Co.

Big Chief Drilling Co., Oklahoma City, Okla., has been awarded contract for Sohio Producing Co. 1 J. M. Young, C SE NE, 25-14n-4w, an east offset to Denver Producing & Refining Co. 1 Young producer and on acreage acquired from the Fox-Schmitz interests.

Delta Drilling Co., Tyler, Tex., has erected derrick for Texas Co. 2 Davis Walton, an exploitation well in the F. G. Landers Survey, Chapel Hill field, Smith County, East Texas.

Ingling & Parker Drilling Co., Wichita, Kans., has assigned rotary rig to wildcat location for 1 Anna Reed, C SW SE, 6-18n-5e, Payne County, Oklahoma. The contracting firm also has taken a deal to work over and test 1 Burris, a wildcat, SE SE SE 34-18n-1e, near the Coyle field, south-

WIRE LINE GUIDES



PATTERSON BALLAGH

CORPORATION

Los Angeles Houston New York City

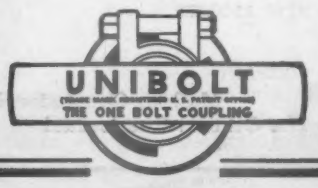
Unibolt

"FLEXI-BALL JOINT"

Clearing house for contraction and expansion in steam lines.

THORNHILL-CRAVER COMPANY

HOUSTON



western Payne County, which is now standing at 5,056 ft. First Wilcox and Hunton will be tested.

R. H. Dearing & Sons, Dallas, Tex., have set surface pipe and will drill a water well while waiting for cement to set on Dick Andrade III 1 R. B. Sharples, an 8,500-ft. Ellenburger wildcat test in northeastern Tarrant County, Texas, 6 miles south and 1 mile west of Grapevine.

John H. Wilson has been awarded contract on the Hugh H. Heinig 1 Micolas Miller, in NE SE SE 36-8n-5w, Ionia County, Michigan.

R. M. Perry is the drilling contractor on Socony-Vacuum Oil Co., Inc., 2 Varnum, in SW SW SW 24-1s-16w, Van Buren County, Michigan.

Rhodes Drilling Co., Abilene, Tex., contracting firm, is preparing to drill John B. Hawley, Jr., 1 J. W. Cook, first of three scheduled Permian lime wildcats in southwestern Howard County, Texas, on a 16,000-acre block. First location is the C SE NW 23-34-1n, T.&P. Survey, 4 miles northwest of the Harding pool.

Gordon Oil Co. has the rotary contract and **Muskegon Development Co.** the cable-tool contract on Chapman Oil Co. 1 State-Grant, in C E½ SE SE 29-16n-9w, Mecosta County, Michigan. The latter firm also has the contract on Chapman Oil Co. 1 James Stehower, in C E½ SE NE 29-13n-8w, Mecosta County.

Scott & Marrs are the drilling contractors on American Production Co. 1 Don H. Compson, in C NE 6-16n-7w, Mecosta County, Michigan.

Lupher Drilling Co. has been awarded contracts on two tests by Pure Oil Co. in Newaygo County, Michigan. These are the 2 Detroit Trust Co., in C E½ SW SE 1-14n-11w, and the 2 C. R. Harris, C E½ SE SW 8-14n-11w.

George P. Livermore, Inc., Lubbock, Tex., has contract for a Clear Fork lime test in northwestern Hockley County, Texas, Brown & Wheeler 1 Earl French, 660 ft. from south and west lines, Labor 22, League 74, Haskell County School Land, 9 miles northwest of Levelland.

Rowan Drilling Co., Fort Worth, Tex., is drilling below 5,210 ft. on Humble Oil & Refining Co. 1 R. A. Cox, 9,000-ft. project in western Gaines County, Texas. The test has had some oil shows in the upper Permian lime, and has been cored.

Gardner Brothers, Tulsa, are making good time on a wildcat for Gulf Oil Corp. in eastern Dawson County, Texas. At last report the hole was below 7,400 ft., with some oil shows encountered above this depth.

Two States Drilling Co., Dallas, Tex., successfully completed a wildcat in northwestern Andrews County, Texas, for Union Oil Co. of California, and rig has been moved one location north for the second well. The producer was completed in the Clear Fork lime for a daily potential of 460 bbl. at a total depth of 7,459 ft.

Sam Vierson, Okmulgee, Okla., has been awarded contract for Flynn Oil Co. and George Deck's wildcat test, northeast of Casey, Pawnee County, Oklahoma, NE 16-21n-6e.

Contracting Firm Formed By Williams and Copeland

Formation of the Williams-Copeland Drilling Co. by O. D. Williams and C. M. Copeland was announced last week. Mr. Williams was connected with Helmerich & Payne, Inc., drilling contractors, for 16 years. During the last 7 years, he was drilling superintendent of the organization.

Mr. Copeland was connected with Helmerich & Payne, Inc., for 7 years in charge of production and engineering. Offices of the new firm are located in the Kennedy Building, Tulsa.

BUILD FOR VICTORY *with* DEVIL DOG Nº 4

No. 4 Devil Dog A. P. I. 4

YOUR service records will show that Jeffrey's 65 years of chain-building experience makes this the superior chain both in war and in peace.

THE JEFFREY MFG. CO.
891-99 N. FOURTH ST., COLUMBUS, O.
Texas Sales Office: 6358 Auden St., Houston

Assembled Liner Reduced Size

100% HARDNESS UNIFORMITY

is assured with MacClatchie "Money-Saver" Pump Liners . . . Every liner must pass rigid testing method covering *entire inner surface*, which reveals any soft spots that would cause breakdown and premature wear.

Uniform wall thickness on all "Money-Savers"—including reduced sizes—lowers handling weight . . . saves money on export shipments. Wear-free gland can be used over again—you need buy only the liner itself when renewing "Money-Savers." QUALITY is the reason more MacClatchie Liners are in use today than any others!

Write for Descriptive Literature

MacCLATCHIE MANUFACTURING CO.

COMPTON, CALIFORNIA

Mid-Continent Distributor:
HAKE TOOL COMPANY, Houston, Texas

Rocky Mountain Representative:
MOUNTAIN SALES & SERVICE CO., Casper, Wyoming

Foreign:
GEORGE R. WOODS, 17 Battery Place, New York, N. Y.

PROVED IN PEACE—IN WAR

'BESTOLIFE Lead Seal Joint Compound has been used successfully in the Oil and Refining industries for the past fifteen years. During that time, it has proved itself superior in protecting threads and in providing tight joints which can be broken out easily.

Today, 'BESTOLIFE has enlisted in the Navy, Merchant Marine and Defense Plants for the duration, and we are proud of this assignment to help in the Victory effort.

But there are still ample stocks of 'BESTOLIFE available on any priority rating, at supply house field stores in every drilling district in the United States and Canada. Use 'BESTOLIFE Tool Joint Compound for *best* results'

MANUFACTURED BY

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES, CALIFORNIA

PERSONALS

WARNER CLARK

Conservation Is Chief Hobby of Warner Clark

WARNER CLARK, chairman of the Conservation Committee of California Oil Producers, official administrative group for PAW in District 5, and general manager of conservation, producing department, Standard Oil Co. of California, was born in Modoc County, California, on May 22, 1886.

He attended the University of California at Berkeley, Calif., and received a B.A. degree in 1916. His first work with Standard of California was at the company's Richmond refinery in 1910. While attending the university he continued working in the refinery and in the oil fields during vacation periods until the end of 1916 at which time he began his full time service with the company.

Mr. Clark's activities have included wildcat exploration work in California commencing in 1920 and wildcatting activities in Ecuador from 1922 to 1926.

He also served in a managerial capacity with Standard of California and the California Co., a subsidiary, for 14 years prior to September 5, 1941, when he was appointed general manager of conservation, producing department, his present position.

Since 1933, he has been a member of the Conservation Committee of California Oil Producers and of its subcommittee on allocation.

Mr. Clark was an army lieutenant in World War 1, and resides in San Francisco which is also the headquarters of the company.

Paul Applin, geologist for Danciger Oil & Refineries, Inc., Fort Worth, Tex., has resigned and will be attached to the U. S. Geological Survey, with his station not yet determined.

Cary P. Butcher, for 9 years district chief geologist for Tide Water Associated Oil Co., Midland, Tex., has resigned and will enter independent geological practice with offices in the Thomas Building, Midland. **R. E. LeBlond,** assistant to Mr. Butcher for the last 18 months, has assumed the duties of district chief geologist for Tide Water at Midland.

J. W. (Bill) Doss, since 1929 landman and scout for American Republics Corp., at San Angelo, Tex., has resigned to become an independent oil operator. Before going with American Republics, Mr. Doss was with the California Co. (now Standard Oil Co. of Texas) at Colorado City. **E. W. Cookenboo,** Houston, has been transferred to San Angelo to take the place of Mr. Doss.

E. H. WALKER

E. H. Walker has been named general manager of the newly created department of industrial relations of the Shell Oil Co., Inc., and of the company's personnel department. He has been with Shell 11 years in the Norco refinery near New Orleans, as assistant to the vice president in charge of manufacturing, and as manager of the personnel department in the New York head office since 1940. **George H. Dempster,** formerly assistant personnel manager, becomes manager of the personnel department. **John C. Quilty,** previously special assistant to Mr. Walker, has been appointed manager of industrial relations. **L. A. Lohman,** named assistant manager of the newly created department, was industrial-relations assistant in the New York personnel office.

F. L. Michaels, Jr., of the firm of McCune & Michaels, geologists and engineers, Fort Worth, Tex., has closed the office of the firm and moved to Cincinnati, Ohio, where he will be associated with his father in the metal-manufacturing business for the duration of the war. **Paul McCune,** the other member of the firm, is a lieutenant in the Army tank destroyers at Killeen, Tex.

D. O. PAYNE

Daniel O. Payne has been appointed acting secretary of the Louisiana Conservation Department, succeeding **Marvin C. Potter,** who has joined the Army. Mr. Payne has been court reporter for the minerals division of the department since 1940, and will continue to hold that position, covering public hearings on Louisiana fields. He formerly was with the O. R. Seagraves interests in Texas, and is a former Austin, Dallas and Los Angeles newspaper reporter.

Waldo Sheldon, manager of Latin-American producing operations for Socony-Vacuum Oil Co., Inc., is returning to Venezuela after a month in the United States.

B. B. Howard, W. F. Jones and **Charles H. Kunze,** marine department managers of Standard Oil Co. of New Jersey, Gulf Oil Corp. and Socony-Vacuum Oil Co., Inc., respectively, are members of the maritime division of the Greater New York Fund for 1943.

E. D. Thompson, for the past 5 years manager of the advertising division of the Standard Oil Co. of California, has been appointed assistant general sales manager of the company. Mr. Thompson has been with the company for 28 years.

Glenn O. Howard, of Corpus Christi, Tex., formerly a petroleum engineer for Humble Oil & Refining Co., in its Tyler, Tex., headquarters, has graduated from the Army Air Forces training command school at Yale University and has been commissioned a second lieutenant.

B. J. Longshore, formerly station engineer at Fredericksburg, Tex., for Shell Pipe Line Corp., has been appointed chief engineer at the company new Deer Park station at Houston, Tex.

W. H. Leter, district foreman for Texas Pipe Line Co. at Humble, Tex., has been transferred to the Corpus

Christi district. He is replaced at Humble by **R. M. Haley**, formerly district supervisor at Eunice, N. M. **R. O. Kirby** has been made assistant to Mr. Haley. Alvin station, Ferndale station, and the Manville station and district have been added to the Humble district.

H. G. SCHAD

H. G. Schad, general manager of transportation of Atlantic Refining Co., has been elected a director of the company, filling the vacancy on the board caused by the recent retirement of **William Downs Anderson**. Mr. Schad joined the company as assistant to the general manager of transportation in 1925, and was made general manager in October, 1941. He is a vice president and director of the Keystone Pipe Line Co. and the Buffalo Pipe Line Corp. and a director of the Atlantic Pipe Line Co., all subsidiaries of Atlantic Refining Co. He is also a director of War Emergencies Tankers, Inc.

Technical Sgt. Douglas C. Glover, formerly a groundman in the pipeline department of Gulf Oil Corp., Houston, Tex., and now on leave at his home in that city, has received the Distinguished Flying Cross, the Air Medal, and three Oak Leaf Clusters since he enlisted in the Army Air Corps in December, 1941. He will report at Salt Lake City, Utah.

H. H. Coffield, oil operator of Rockdale, Tex., suffered severe loss last week, when a business block owned by him and containing offices, a warehouse and cold-storage plant, was destroyed by fire. Total loss was placed at $300,000.

James M. Doughty, of Robstown, Tex., formerly assistant to the vice president of Southern Minerals Corp., Corpus Christi, and now an aviation cadet, has been advanced to basic flight training at the Enid, Okla., Army airfield.

I. C. Murphy, personnel representative in the Mid-Continent district for Shell Pipe Line Corp., has been appointed district foreman of the Cushing-Wood River line, assisting W. B. Sanders, division superintendent. Previously, Mr. Murphy was station chief engineer and mechanical maintenance supervisor on the same segment of the line from the Arkansas River to the Mississippi.

R. L. Hanlin, formerly district chief gager at Kilgore, Tex., (south district) for Shell Pipe Line Corp., has been promoted to terminal supervisor at the Houston, Tex., refinery. **C. E. Slater**, acting as area materialman at Houston, succeeds Mr. Tanlin at Kilgore.

John B. Finney has been promoted to general foreman of Standard Oil Co. of New Jersey's Bayway boilermaker department, following 11 years' service as assistant to the late J. A. McCarthy. **Daniel J. Brennan** becomes boilermaker foreman in charge of all field work. **Charles Hodges**, foreman of the welding, formerly attached to the boilermaker department, will report direct to the assistant mechanical engineer for the company.

John F. O'Donohoe, Wichita Falls, Tex., independent producer and president of the Petroleum Producers Co., and an officer of several trade associations, has been appointed a member of the Texas postwar planning commission by **Gov. Coke R. Stevenson.**

Thomas J. Casey, counsel for the California division of Barnsdall Oil Co., has been made manager of the land department in that area.

H. S. McCray, superintendent of the Texas Co. refinery at Sunburst, Mont., has been transferred to Amarillo, Tex., to succeed G. E. McSwain, superintendent of the Amarillo plant, who died recently from injuries received when thrown from a horse. W. G. Copeland, assistant superintendent at Laurenceville, Ill., will succeed Mr. McCray at Shelby.

John E. Scoggins, formerly assistant cashier of the Standard Oil Co. of California, became cashier of the company September 1. His appointment follows the retirement of **George C. Hill**, who has been with the company 32 years. Mr. Scoggins has been with Standard of California since 1911. **George A. Reams** replaces Mr. Scoggins as assistant cashier.

Harold Hoots, chief geologist for Richfield Oil Corp., is expected back at his Los Angeles, Calif., office within the next week, following an extended geological trip to South America.

Clyde A. Swigart, who has been an employe of Standard Oil Co. of California since 1911, has been appointed manager of the pipe-line department succeeding **Stuart Moser**, who retired September 1 after 33 years' service with the company.

D. M. Cameron, manager of foreign and general shipments of Union Oil Co. of California, Los Angeles, has moved his office to New York City. During his absence **J. W. Graham** will carry on with title of assistant manager.

Urban M. Warren, drilling foreman for Shell Oil Co., Inc., in its San Joaquin district, Bakersfield, Calif., has been transferred and assigned the same duties in the Sacramento area, Marysville, Calif. **James S. Walp**, driller for Shell in the coastal division at Ventura, Calif., has been promoted to drilling foreman in the San Joaquin district, succeeding Mr. Warren.

Ted Kitley, head roustabout for Shell Oil Co., Inc., in the coastal division at Ventura, Calif., has been promoted to foreman of construction and maintenance in this district.

Ralph E. Ashbaugh, drilling foreman for Shell Oil Co., Inc., at Bakersfield, Calif., San Joaquin division, has been assigned similar duties and transferred to Oilfields, Calif., in the same district.

Walter M. Cheney, drilling foreman in the San Joaquin division for Shell Oil Co., Inc., at Bakersfield, has been transferred to Ventura in the coastal division.

James R. McEntee, field engineer at Long Beach, Calif., in the Los Angeles Basin division, and **Loy M. Charter**, junior exploitation engineer at Oilfields, San Joaquin division, for Shell Oil Co., Inc., have been transferred to Ventura, coastal division, and assigned similar duties.

Wesley R. Kinney, exploitation engineer for Shell Oil Co., Inc., in the San Joaquin division, has been transferred from Bakersfield to Oilfields, Calif.

Clifford T. Magin, foreman of the analytical laboratory and **William K. Plucknett**, chemist, at Shell Oil Co. Inc.'s Wilmington, Calif., refinery, have been appointed technologists at that plant. **William J. Rupnik**, chemist, suceeeds Mr. Magin as foreman of the analytical laboratory. **Arthur B. McGlade**, refinery engineer, has been transferred from the head office at San Francisco to the Wilmington plant. **Louis M. Mottier**, machinist subforeman at the Wilmington refinery, has been promoted to foreman.

Lt. James Foley, who was employed as a roustabout by Amerada Petroleum Corp. in the Fairbanks field, Harris County, Texas, when he enlisted in the air forces in April 1942, is now a flight commander and first pilot on a B-17 Flying Fortress at Pecos, Tex.

Henry Rogatz and **Dick Punches**, former geologists at Amarillo, Tex., have recently been promoted to captaincies in the Army. Captain Rogatz is in the intelligence division of the Air Corps and Captain Punches is in the Engineering Corps.

Market Developments

East Coast

NEW YORK.—In spite of severe local gasoline shortages last week, which resulted in the temporary closing of an estimated 75 per cent of the service stations, there were several indications that the over-all East Coast supply situation is improving. These were the continued, sharp increase in the index of available supplies, the rise in deliveries via the big-inch line and the record total of deliveries to District 1 by all methods of transportation.

The index of available supplies shot up to 39.1, an increase of 4.6 points in 2 weeks, the sharpest gain in the entire period in which the index has been used. This brought stocks to almost exactly two-thirds of what they were a year ago.

Overconsumption was the principal cause of the gasoline shortage, but it was abetted by inability to obtain supplies outside the district. The shortage was eased somewhat when first - of - the - month deliveries were made. Above-ceiling prices, resulting from the shortage of gasoline, were reported, in one instance, to have reached $1 per gallon.

Mid-Continent

TIGHTNESS of the refinery market became more acute this week as sellers consistently declined to quote on inquiries for gasoline. Refiners are showing no interest in new business either for prompt shipment or for deferred loading.

The most troublesome factor in the Mid-Continent refinery market is inability to arrange for crude-oil supplies. Strong pressure is being exerted from all quarters to hasten arrangements for delivering West Texas crude to District 2 refiners. Washington agencies are studying the proposal for federal reimbursement covering tank-car freight costs on approximately 50,000 bbl. of West Texas crude which would be delivered to Mid-Continent refiners.

All products are in brisk demand, particularly natural gasoline, which is virtually unavailable in the spot market. Supplies of light burning oil are lagging behind the seasonable level attained last fall because increasing quantities of stocks in the gas-oil range are moving to cracking plants for production of military motor fuels.

Gasoline demand during the week preceding Labor Day was reported almost level with the bulge in requirements occurring at the same season in previous years. The difference from normal demand, however, was apparent from the source of orders for motor fuel. Customarily, the large buying preceding holidays is concentrated in areas of large population and at resort centers. Bulk of this year's business originated in agricultural areas.

Middle West refiners continued this week to draw down gasoline stocks in order to meet demand in District 2 and to supply the quota of 50,000 bbl. daily to the East Coast. Manufacturers are showing increasing concern over their ability to meet current demand, and most of them have liquidated motor-fuel stocks to minimum working levels. Further reductions in stocks, many refiners report, will impair their ability to meet shipping quotas.

Rivalry for crude-oil connections is intense. Frozen prices virtually preclude raiding connections because of the regulations preventing payment of premiums and offering of other inducements customarily used in relations between purchasers and producers.

Natural Gasoline

Natural-gasoline prices in the Oklahoma (Group 3) and North Texas markets were advanced by two stages in August. The quotations August 24 should have been 4.125 in Oklahoma and 3.750 in North Texas for 26-70. Quotations on the same material advanced to 4.375 in Oklahoma and to 4 cents in North Texas. The 18-55 quotations advanced correspondingly to a current level of 5.125 in Oklahoma and 4.750 in North Texas.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended August 28, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	105	2,083	537	913
Ind., Ill., Ky.	741	14,158	3,389	5,792
Okla., Kan., Mo.	324	6,038	1,718	2,106
Censored area*	2,173	30,545	16,576	16,402
Rockies	94	1,318	744	380
California	730	18,383	44,305	12,333
Total 8-28-43	4,227	72,525	67,250	37,928
Total 8-21-43	4,046	72,815	66,724	37,464
Total 8-28-42	3,705	79,713	78,270	42,818

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
August 28, 1943	236,170,000
August 21, 1943	236,466,000
August 29, 1942	248,364,000

*Excludes unrefinable California stocks.

Pacific Coast

LOS ANGELES, Calif.—Competitive grade gasoline was eliminated from southern California markets this week although it may be several weeks before it becomes noticeable due to inventories carried by service stations. It has been generally agreed to concentrate on premium and regular grades and to abolish competitive grade motor fuel.

Not all independent refiners can be expected to comply but a large majority realize the present market is a quality market and will concentrate on better fuels.

In some cases the tank-car price of competitive gasoline is close to regular and only slightly less than premium.

As a result of increases in loading-rack prices posted this week there has been a tendency for quotations to stiffen generally. Gasoline has tightened up during the past several weeks not so much in price as in the volume offered. Natural gasoline has also become quite scarce and gas oil has been commanding top prices for several months. Fuel oil has been in good demand but no great amount has moved in the spot market as refiners are holding for higher prices.

Gulf Coast

HOUSTON, Tex. — No signs were visible this week of any easing in a refinery market which for months has been steadily growing tighter. With the possible exception of Bunker C fuel oil, no product has escaped the shortage which is creating seriously problems of supply.

Some sellers say they are receiving fewer appeals from eastern buyers than they did a month or two ago, because buyers have come to realize the futility of attempts to uncover supplies.

Although this territory is the primary source of gasoline for the Atlantic seaboard, removal of the ban on pleasure driving in the northeastern area can have no effect on the quantity of motor fuel shipped out of this region for East Coast consumption. All the gasoline available for eastern movement has been going in that direction for months. Under existing PAW restrictions District 3 can ship no petroleum products for civilian use into District 2 until the needs of the East Coast have been filled.

Refinery Prices

(Prices as of September 7)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	70-72	68-70	63-66
Mid-Continent*	.....	.....	6.000	.....	5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	6.750-7.500	6.250-6.500	6.125-6.250	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	48	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C†
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †Gravity range. ‡Pacific Specification 200

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300 §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.375	5.125
North Texas	4.000	4.750
North Louisiana	4.125	4.875
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D. 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
400 dark green (untreated)	9.00

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)	
10 pour point	30.50
15 pour point	29.50
25 pour point	25.00 28.00
Steam refined:	
300	15.00 16.00
450	15.50 16.50
600 flash	16.00 17.50
630 flash	17.00 17.50

Neutral Oils

Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—

300-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Neutral Oils

Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.20
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Chicago, Ill.	14.10	4.50	10.60
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.60
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.20	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.90
Minneapolis, Minn.	15.90	5.50	10.60
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.20
Average 14 cities	15.20	5.97	9.04

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.20
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.20
Average 11 cities	18.34	7.50	10.50

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.88	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

Canadian Fields

(Continued from Page 98)

daily after acidizing, and is now making slightly over 200 bbl. a day on its own gas, with tests continuing.

Turner Valley lime test is north extension. — Imperial-Hudson's Bay 14, LSD 13, 8-21-3w5, finished at 8,801 ft. with Madison at 8,202 ft., has set liner to test lower lime, and on acidizing increased production from 5 to 14 bbl. an hour. Two lime zones are still to be tested.

New faulting theory. — As a result of recent Turner Valley drilling, operators are inclining to the theory that Turner Valley geological formations are marked by echelon faulting, in place of continuous faulting. If the new theory is correct, it will open the possibility of extensions to the field on either flank of the structure.

Mississippi Fields

(Continued from Page 99)

cent test through perforations at 10,273-76 ft. Gulf 1 Aden Davis, 15 miles northeast of Laurel, in Wayne County, is still a question mark. After perforations at 6,668-74 ft. had been squeezed the hole was drilled out to 6,684 ft. and casing was perforated at 6,666-72 ft. When a drill-stem test was made through 2-in. tubing, with packer at 6,612 ft., the well would not flow. The crew began swabbing, and at latest report the well was swabbing pipe-line oil from 300 ft.

Sinclair Wyoming Co. abandoned location for 2 Wausau Southern Lumber Co., 25-8n-10w, in Jones County. California Co. 1 Hettie Smith unit, 4-7n-7e, Lincoln County, cored from 10,514 to 10,545 ft., with no shows. At total depth of 10,660 ft. the well was shut down for repairs.

ALABAMA

The Humble Oil & Refining Co. has staked location for a 10,000-ft. wildcat in Washington County, in the southwestern part of the state. It is the 1 C. D. Scott, NW NE 28-6n-4w, about 8 miles west of the town of Chatom and east of the recent Gulf discovery in Wayne County, Mississippi. The Standard of New Jersey was reported to be holding big blocks in townships 2, 3, 4, 5, 6 and 7n, and ranges 3, 4, and 5w.

California Fields

(Continued from Page 97)

wildcat, in 11-2s-11w, may have found what a number of other operators have been looking for in this general area for a number of years.

A number of new wells would be drilled in the east Torrance field where the Ranger zone of Wilmington overlaps the area, if some provision could be made to change the present acreage limitations. This change would open up another 75 acres and permit increased production from the Ranger zone which falls in the low-gravity range.

COASTAL DISTRICT

Ventura County.—Standard has hit several showings in 1 Crestmont, in the Piru district on the Ramona anticline. On a formation test at 6,020-6,110 ft., the recovery consisted of 1,500 ft. of gassy 20-gravity oil and 200 ft. of water. Continental Oil Co. has suspended work on 2 Holser in the same section. Continental pioneered wildcat work on this anticline which is jackknife in character with steep dips and sharp changes. Continental cored several hundred feet of oil sand in its initial well which was carried down to determine deep-zone possibilities but it was too tight to produce commercially and the lower part was abandoned.

Lloyd Corp. 10 Lloyd was completed in the Ventura Avenue field flowing at a daily rate of 1,000 bbl. from 10,194 ft. with effective depth at 10,190 ft.

CALIFORNIA WILDCAT COMPLETIONS

San Joaquin Valley

South Belridge wildcat district, Kern County: Sentinel Oil Co. 1 Belridge, 10-28s-20e, abandoned, T.D. 3,912 ft.

Round Mountain wildcat district, Kern County: Trico Oil & Gas Co. 1 Workman, 5-29s-29e, abandoned, T.D. 1,382 ft., bottomed in Walker sand, no Vedder sand present.

Shale Hills wildcat district, Kern County: Shell 45-7 Utting, 7-27s-19e, abandoned because of mechanical difficulty, T.D. 660 ft., drill pipe stuck at 656 ft.

Los Angeles Basin

Alhambra wildcat district, Los Angeles County: Chris Schirm 1 Huntington Land Co., 24-1s-13w, abandoned, T.D. 3,919 ft.

Puente wildcat district, Orange County: C. E. McCartney 1 Hurley, 4-2s-10w, abandoned, T.D. 3,259 ft., cored Miocene oil sand 3,165-3,259 ft., formation test 3,160-3,259 ft., recovered 29 stands salt water, not a trace of oil or gas.

Coastal District

Carpinteria wildcat district, Santa Barbara County: California Pacific Oil Co. 1 Carpinteria, 19-4n-24w, abandoned, T.D. 2,082 ft.

Zaca Creek wildcat district, Santa Barbara County: General Petroleum 2 Wickersham, 24-8n-32w, abandoned as not commercially productive, T.D. 5,189 ft., P.B. 4,125 ft., pumped approximately 25 bbl. of 9-gravity oil per day with assistance of about 50 bbl. daily of circulating distillate.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the East Lance Creek oil and gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226) at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on October 14, 1943, in the following units: Parcel No. 1, T. 36 N., R. 64 W., sec. 28, W½SE¼; Parcel No. 2, T. 36 N., R. 64 W., sec. 29, E½ SE¼. Each lease will be made subject to the unit plan for the East Lance Creek Unit Area, Wyoming, approved March 2, 1938. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. In the even the same bidder is the successful bidder on both parcels, he may consolidate them into a single lease since the total acreage does not exceed 640 acres. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Cheyenne, Wyoming. Notice is hereby given that the N½NW¼ sec. 14, T. 26 N., R. 90 W., 6th P.M., 80 acres, Lost Soldier oil and gas field, Wyoming, is offered to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the leasing act as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226) at a sale to be held in the District Land Office at Cheyenne, Wyoming, at 10 a.m. on September 30, 1943. The land will be offered in a single unit. The successful bidder must deposit on the date of sale with the officer in charge of the sale a certified check or cash for one-fifth of the amount bid and the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. William G. Johnson, Register.

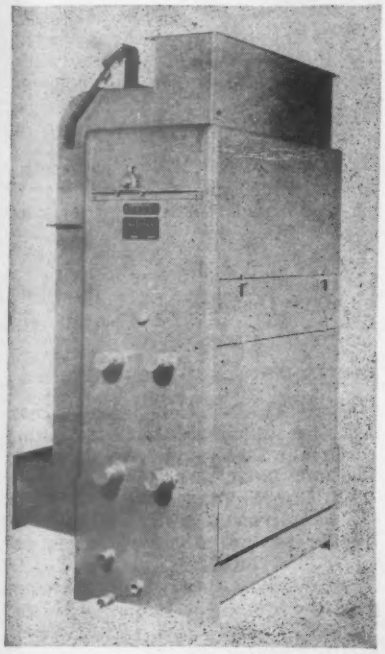
LEGAL

U.S. DEPARTMENT OF THE INTERIOR District Land Office, Cheyenne, Wyoming. Notice is hereby given that the lands herein described within the known geologic structure of the Boone Dome gas field, Wyoming, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226), at a sale to be held in the district land office at Cheyenne, Wyoming, at 10 o'clock a.m. on September 30, 1943, of the following parcels: Parcel No. 1, T. 35 N., R. 85 W., sec. 9, NE¼NE¼, N½NW¼, SE¼ NW¼, E½SW¼, W½SE¼, SE¼SE¼; sec. 10, SW¼NW¼, NW¼SE¼, SE¼SE¼; Parcel No. 2, T. 35 N., R. 85 W., sec. 14, W½NW¼, SW¼; sec. 15, E½NE¼, N½SW¼, SE¼SW¼, S½SE¼. Each successful bidder must deposit on the date of the sale a certified check or cash for one-fifth of the amount bid by him, and file a showing of qualifications to receive the lease as required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. Each parcel will be offered for sale separately. In the event one bidder is awarded both parcels, a collective bond in sufficient amount may be furnished to cover the two leases he obtains. Bids may be submitted by mail provided they are accompanied by one-fifth of the bonus bid, and a showing of qualifications of the bidder. The envelopes should be plainly marked for opening on the day and hour of the sale. The bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. William G. Johnson, Register.

Equipment Progress

New Development For Maintaining Constant Temperatures

A new development for adding heat to industrial liquids for the purpose of maintaining constant temperatures



as desired, with automatic control, is announced for the Niagara Aero heat exchanger. This is accomplished by using either a steam coil or injector or an electric heating unit to heat the spray water. U. S. Patent 2321933 has recently been granted on this equipment.

The result is control of liquid temperatures within prescribed limits, alternately cooling or heating as required. The heating device is put into operation by thermostatic control at the desired point, preventing the liquid from becoming too cold for the process in which it is used, or from becoming viscous with retarded flow and loss of capacity, or from congealing or freezing. This also makes it possible for the heat exchanger to be successfully installed out of doors, or to use fresh, out-of-door air to increase its evaporative cooling capacity and avoid damage from handling air containing corrosive substances.

The heat exchanger with these features is used to control temperatures in industrial, chemical process and electrical equipment by controlling jacket water temperatures, also quenching baths in the heat treating of metals, cutting oils and lubricants in metal working, machining and wire drawing, controlling temperatures of chemical process liquids in many fields condensing gas vapors and cooling engine jacket water. It is also applied to air and gas compressors. It is manufactured by Niagara Blower Co., 6 East Forty-fifth Street, New York 17, N. Y.

Booklets for Wartime Assistance to Foremen

Elliott Service Co., 219 East Forty-fourth Street, New York City, has published seven practical pocket-size booklets designed to help industrial foremen meet wartime demands. The booklets are written by Glenn Gardiner, an authority on foremanship training and industrial relations. The booklets are:

"How to Train Workers Quickly."
"How to Handle Grievances."
"How to Create Job Satisfaction."
"How to Cut Waste."
"How to Get Out More Work."
"How to Correct Workers."
"Qualities of a Good Boss."

The booklets are prepared in manual form, and are written in practical style for easy understanding.

Trade Literature

Osmose Wood Preserving Co. of America, Inc., 1437 Bailey Avenue, Buffalo, N. Y.—Bulletin outlining the Osmose wood-preserving process for prolonging the life of timber. Osmomelts are furnished in dry powder form and mixed with water for application to lumber. Advantages claimed are that Osmose-treated lumber is decayproof, termite-repellent, and that it can be easily and quickly applied in the field.

Metallizing Co. of America, 1330 West Congress Street, Chicago, Ill.—A 40-page catalog which deals with all phases of the metallizing process. Information is classified according to industry. The Mogul metallizing gun is fully illustrated and described part by part, with complete specifications and engineering data. The new Mogul electric bonder is also described.

Automatic Temperature Control Co., Inc., 34 East Logan Street, Philadelphia, Pa.—Catalog A5, covering ATC Type 3 electrical control motors. The

ARMY-NAVY HONOR TAYLOR INSTRUMENT COMPANIES

L. B. Swift, president of the company; Col. John A. Rogers U.S.A.; Claude W. Carr, U.S.N., and Elmer C. Hursh, president, Taylor Fellowship Club

Taylor Instrument Companies, Rochester, N. Y., have been awarded the Army and Navy "E."

L. B. Swift, president of Taylor's, accepted the "E" flag and pledged the organization to ever greater effort in producing instruments for winning the war. Elmer C. Hursh, president of the Taylor Fellowship Club, accepted the "E" pin from Capt. Claude W. Carr in behalf of the employes. Captain Carr was assisted in the pin presentation by Staff Sergeant George Williams, tail gunner of a Flying Fortress, who won the Purple Heart and Air Medal for shooting down two German planes even though he himself was severely wounded.

catalog is illustrated with many photographs and drawings of the numerous mounting arrangements with different type valves for the control of air, gas, oil, steam and chemical solutions. There are also electrical data and wiring diagrams, together with descriptions and dimensions of commonly mounted valves.

Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago, Ill.—Bulletin 3000 A, entitled "Fairbanks Morse Diesels for Profitable Power." This 24-page bulletin includes a brief history of the company's background, together with particulars on design, manufacture and service facilities applicable to the entire commercial line of marine and stationary diesels.

Third Navy "E" Award to Union Wire Rope Corp.

Rear Adm. Alex M. Charlton, U.S.N., inspector of Navy materials, Chicago, congratulates heavy muscled Richard Kauzlaurich for his record on the production line.

Mr. Kauzlaurich, a machine operator in the plant of the Union Wire Rope Corp., in Kansas City, topped the winners in 14 other departments with a work record of 10 hours and 48 minutes nightly since the first of the year. To him went the honor of raising the Navy E flag awarded for the third time to the employes and management of the plant for 18 months of production meeting "E" award standards.

Among Equipment Men

Society Holds Technical Meeting and Dinner

With the annual golf tournament a war casualty, due to the ban on pleasure driving in the East, the oil and gas section of the Engineers' Society

D. D. Foster (left), Pittsburgh Equitable Meter Co., chairman oil and gas section and H. H. Pigott, Equitable Gas Co., committee chairman for dutch treat party. Both events were sponsored by the Engineers' Society of Western Pennsylvania

of Western Pennsylvania, on Friday, July 16, transferred summer activities to the William Penn Hotel in Pittsburgh.

A total of 176 members turned out for a technical meeting in the afternoon, followed by a reception and dinner in the evening. The afternoon program was in charge of D. D. Foster, assistant sales manager of Pittsburgh Equitable Meter Co. B. C. Thiel, consulting engineer for Cooper-Bessemer Corp., read a paper "Modern Compressor Stations," and James F. Swain, geologist with Huntley & Huntley, covered the subject of "Interpretation of Driller's Log." Through the courtesy of Barrett division, Allied Chemical & Dye Corp., the group was then shown the motion picture "Oil for War"—the story of the big-inch line.

A "dutch treat" reception and dinner followed, under the sponsorship of a committee headed by H. H. Pigott of Equitable Gas Co.

Kunkel Elected Vice President N.I.A.A.

Elected to vice presidency of National Industrial Advertisers Association, Inc., is John H. Kunkel, director of public relations and advertising at Fluor Corp., Ltd., Los Angeles, Calif. Mr. Kunkel is also a member of the board of directors of N.I.A.A. and president of the Los Angeles chapter, Industrial Advertising Association of Southern California. This is his second term as head of the Los Angeles group.

McGrath Joins Carrier Corp. Engineering Staff

A recent addition to the engineering staff of Carrier Corp., Syracuse, N. Y., is William L. McGrath, according to an announcement by Herbert L. Laube, vice president and head of the engineering division.

Since his graduation from University of Minnesota, Mr. McGrath has had extensive training and experience with Minneapolis-Honeywell Regulator Co., both at the Minneapolis factory and in the Philadelphia territory, where he has been acting as supervisor of the air-conditioning controls division.

Prior to his departure from that city, Mr. McGrath was active in the Philadelphia section of the American Society of Refrigerating Engineers.

Boyd Brazeel With International Cementers

With Boyd Brazeel as district manager, International Cementers, Inc., announces the opening of a new district office with headquarters at Wichita Falls, Tex.

Mr. Brazeel is well known in that area where for several years he operated Service Oil Well Cementing Co. which has been dissolved prior to his new association with International Cementers, Inc.

Monsanto Chemical Co. Announces Personnel Changes

Monsanto Chemical Co., St. Louis, Mo., has announced the following changes in the organization, all effective next November 1:

William M. Rand, vice president of the company and general manager of the Merrimac division with headquarters at Everett, Mass., was elected to the executive committee of the company, with headquarters in St. Louis.

Daniel S. Dinsmoor, assistant general manager of the organic chemicals division with headquarters in St. Louis, has been elected a vice president of the company and will succeed Mr. Rand as general manager of the Merrimac division.

Julius A. Berninghaus, general manager of the organic chemicals division, with headquarters in St. Louos, will retire on November 1, 1943, at age 65, a compulsory requirement under the company's retirement pension plan. He will continue his active participation in the company's business, however, in an advisory capacity to his successor.

Osborne Bezanson, vice president of the company and general manager of the Texas division, with headquarters at Texas City, Tex., will succeed Mr. Berninghaus as general manager of the organic chemicals division with headquarters in St. Louis.

The Texas division of the company with plants at Karnack and Texas City, will be consolidated with and become a part of the organic chemicals division.

Classified Advertising

EQUIPMENT FOR SALE

FOR SALE—1—14 x 12 Gardner-Denver Twin Cylinder-Piston Valve Type Roller bearing complete enclosed oil bath—steam engine mounted on 12 x 12 H Beam steel skids with necessary cross members and braces 20 feet long with National steam separator and trap-force feed oil pump and 9" Badgett steam lubricator for dual oil system — 3" Brown throttle valve — 22 tooth dual drive split sprocket for 1240 double chain. All the above mounted in unit and completely piped and fitted for steam connection.

2—12 x 12 Oil Well Supply Twin Cylinder steam Engines mounted—fitted and equipped as above—Approximate HP 750.

None of these engines need overhauling or repairs. They are ready to go.

1—OWS 9 x 9 x 9 Drawworks unit with hydromatic brake, double engine drive water cooled drum complete with guards and chains.

1—400 ton 8" Ideco swivel complete w/gooseneck and left hand bottom connections.

Other drilling equipment, also 3½ and 4½ O.D. Drill Pipe for sale. F. H. BROWN. P. O. Box 361, Carmi, Illinois.

1—500 HP Terry condensing turbine—1750 RPM.

1—700 HP Terry condensing turbine—2900 RPM.

1—100 HP Superior twin gas engine compressor.

1—22/13 x 14 Sullivan angle 2 stage 1250' Compressor with 250 HP motor. Rebuilt $7,000, on cars.

1 I. Rand type XPVR 1800 ft. compressors, steam driven.

1—4" Pacific 10 stage centrifugals—500 GPM-750#.

1—600" x 34' Southwestern flash column.

1—750 sq. ft. Southwestern condenser, steel shell, admiralty tubes.

1—670 sq. ft. Braun 6 pass, 250# atmospheric section.

1—40 sq. ft. G. Rusell shell and tube condenser, 800# WP.

1—14 x 12 I.R. cylinders XRB

1 14 x 14 I.R. cylinders XRB.

DAVE WEST COMPANY
2301 East 37th St., Los Angeles, Calif.

FOR SALE: Approximately 5000 feet of 4½" left-hand drill pipe; also 6" Kelly with connection for running same. This drill pipe is made up in doubles of about 45 feet. All tool joints and collars have heavy welds. Box B-789, The Oil and Gas Journal, Tulsa, Okla.

2—100 bbl. tanks $225.00, 1—Buda 180 HP Diesel skid type motor $2500.00, 1—Rotary Table with round drive, kelly, and swivel, $1250.00. Also, National machine complete with tools and accessories. Call 1312 Odessa, Texas.

UNITIZED Gasoline Powered Outfit—capacity 3500 ft., 2 strings drill pipe 3½ to 3⅜" near Holton, Kansas. $10,500 cash. Further information write owner M. J. Lewis, 1201 Bennett, Long Beach 4, Calif.

FOR SALE—PIPE

30,000 feet 2½" standard black reconditioned T&C strictly A 1.
45,000 feet 3" O.D. 5.25# wrought iron tubes, plain end, suitable for refining boilers, welded line, etc.
25,000 feet 6¼" 13# (6⅝ O.D.) casing T.C. good condition.
15,000 feet 18" O.D. Spiral weld pipe 10 ga. lengths 14 feet to 20 feet, good condition.
30,000 feet 30" O.D. Spiral weld pipe, 14 ga. all 30 ft. lengths, excellent condition.

Available for immediate shipment. Prices and further information on request.

Wire, write or phone Sonken-Galamba Corp., Riverview at Second St., Kansas City, Kans. Phone VI. 9243.

EQUIPMENT FOR SALE

FOR SALE: 9000' or any part used 3 conductor electric cable in good condition for any service 1000 volt or less. Price 25c to 45c per ft. Free sample on request. John Irby, P.O. Box 4387, Oklahoma City, Okla

---

FOR SALE: Oil refinery equipment including high and low pressure valves, gages. List of items sent to interested buyers on request. HARVEY BROTHERS, Parkdale, Colorado.

DRILLING RIGS for sale for cash; or on acceptable terms of credit.

1—Wilson Giant Diesel Rig, with two 225 HP Cummings Diesel Motors, compounded; 14 "x 7¼" x 14" Gardner-Denver pump; heavy derrick and heavy equipment entirely suitable for 5500 foot drilling; with or without drill pipe.

1—Diesel Rig, with two 225 HP Cummings Diesel Motors, compounded; 8" Emsco H-46 unitized draw works, with roller bearing drum shaft; 14" x 7½" x 14" new Gumbo Buster pump, made part of one well only; heavy duty OCS clutch; heavy derrick, and everything else about the rig suitable for drilling to 7500 feet; with or without drill pipe.

1—Steam Rig, less drill pipe, with
3—125 HP 300# WP Kewanee boilers.
2—14" x 7¼" x 18" Wilson Snyder mud pumps, unitized on same skid.
1—Unitized boiler feed pump unit, with two 10" x 4½" x 10" pumps.
1—12" x 12" Gumbo Buster roller bearing, fully enclosed engine.
1—25½" Gumbo Buster fully enclosed oil bath rotary table.
1—9" Acme Unitized Draw Works.

Other items are generally complete, but there may be a few items short. Both of the diesel rigs described above are now running and can be inspected on the job. Box B-784, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Approximately 40,000 ft. of used 7" O.D. 24# plain end line pipe. Available for immediate shipment from Oklahoma points. Central Supply Co., 109 N. Elgin, Tulsa, Okla.

CASING
15,000 feet 6⅝" 22 lb. No. 1 lapweld casing.
LINE PIPE
20,000 feet 3" T & C Standard line pipe, No. 1.
Located Yale, Oklahoma
BENDER SUPPLY COMPANY
1205 Marshall Street, Shreveport, La.

SPECIALIZING IN
Used and New Machinery and Industrial Equipment. Domestic—Export
Contact us if you have any surplus equipment for sale or if you wish to purchase Industrial Equipment.
Industrial Supply & Equipment Co., Inc.
New Orleans, La., Canal Bldg., MAgnolia 5586
Tulsa, Okla., 310 Thompson Bldg., Phone 5-3296

Cross Reaction Chambers

2—60" O.D. x 44' x 4" Thickness Vessels, Hammer-Welded Construction, Fabricated by Krupp. Available for immediate delivery. Price on application.

Wire, Phone or Write

REFINERY EQUIPMENT, INC.
Tulsa 1, Okla.

EQUIPMENT WANTED

WANTED
Several Steel Clad Buildings
30' to 60' wide
(Or wider if you have them)
and
100' to 500' long.

Please give all details, location, and price.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, Illinois

WANTED
Used storage tanks:
Pressure Tanks:
All sizes
Send us your list
SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

SMALL rotary drilling equipment complete. Good for 2500'. List everything with make and price in first letter. Box B-783, The Oil and Gas Journal, Tulsa, Okla.

WANTED
1—7" Cameron 6000# Test, Pressure Operated, Flow Line Valve.
1—10¾" Cameron 6000# Test, Pressure Operated, Master Valve.
1—7" Cameron 6000# Test, Pressure Operated, Blowout Preventer.

We are interested in new and used equipment. Do not offer used equipment unless in perfect operating condition. Quote condition and price. Danciger Oil and Refining Co., Fort Worth, Texas, LD 142, G. B Magruder, Jr.

ONE Brunner LP Gas Unit for unloading Butane. Give full particulars. Jos. Greenspon's Son Pipe Corp., National Stock Yards, St. Clair County, Illinois.

WANTED
Used Structural Steel
Pipe — Valves
Fittings
Send us your list
SONKEN-GALAMBA CORP.
108 N. 2nd St., Kansas City, Kansas

WANTED

STEEL MANUFACTURER will purchase outright—or manufacture on royalty basis—drilling or pumping specialty. May also employ patentee or owner for sales promotion. Interested in prompt conclusion of working agreement. Write Box B-785, The Oil and Gas Journal, Tulsa, Okla.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 218 East Third St., Tulsa, Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

ADVERTISERS IN THIS ISSUE

American Roller Bearing Co. 89
American Rolling Mill Co. 36
American Well & Prospecting Co. 63
Badger & Sons Co., E. B. 19
Baker Oil Tools, Inc. 28
Brewster Company, The 100
Bucyrus-Erie Company 89
Bullard Co., E. D. 74
Classified Advertising 109-110-111
Cooper-Bessemer Corp., The 49
Crutcher-Rolfs-Cummings 86
Darling Valve & Mfg. Co. 90
Dean Bros. Pumps, Inc. 76
Dehydro Company, The 80
Dowell Incorporated 24
Dugas Engineering Corp. 61
Erie Bolt & Nut Co. 87
Everstick Anchor Co. 78
First National Bank & Trust Co. of Tulsa, The 86
Fraser-Brace Engineering Co., Inc. 78
Gates Rubber Co., The 14-15
General Geophysical Co. 82
Girdler Corporation, The 44
Goodrich Co., The B. F. 8
Grancell, I. H. 101
Grizzly Mfg. Co. 8
Gulf Oil Corp. 20
H & M Pipe Beveling Machine Co. 81
Houdry Process Corp. 2
Hughes Tool Co. ..... Back Cover
Hunt Tool Company 21
Hycar Chemical Co. 12
Independent Exploration Company 57
Jeffrey Mfg. Co., The 101
Johns-Manville Corporation 88
Justrite Mfg. Co. 76
Kellogg Company, The M. W. 16
Lincoln Electric Company, The 43
Link-Belt Company 11
Little, I. C. 81
Lone Star Cement Corporation 64
MacClatchie Manufacturing Co. 101
Maloney Tank Mfg. Co. ..... Front Cover
Marsh Corp., James P. 10
McDonald Co., B. F. 92
Mission Mfg. Co., The 46
National Airoil Burner Co., Inc. 78
National Radiator Co., The 68
Page Fence Association 93
Parkersburg Rig & Reel Co. 67
Patterson-Ballagh Corporation 100
Peerless Pump Division of Food Machinery Corp. 100
Penberthy Injector Co. 37
Perco Division—Phillips Petroleum Co. 98
Petroleum Electric Power Association 98
Petroleum Rectifying Co. ..... Inside Front Cover
Pittsburgh Plate Glass Co. 17
Preformed Wire Rope Co. 22
Reed Roller Bit Company ..... Inside Back Cover
Republic Steel Corporation 13
Ross Heater & Mfg. Co., Inc. 4
Schundler & Co., F. E. 80
Shand & Jurs Co. 23
Soph Company, The Edward 78
Sperry-Sun Well Surveying Co. 98
Strom Steel Ball Co. 80
Sturtevant Co., B. F. 78
Texaco Development Corporation 6
Texas Electric Steel Casting Co. 1
Texas Pipe Bending Co. 78
Thomas Flexible Coupling Co. 74
Thompson Products, Inc. 88
Thornhill-Craver Co., Inc. 100
Timken Roller Bearing Company 3
Twin Disc Clutch Co. 9
Universal Oil Products Co. 41
Wellman Co., The S. K. 91
Wheatley Pump & Valve Mfr., Frank 93
Wilson Manufacturing Co. 5
Worthington Pump & Machinery Refrigeration and Air Conditioning Div. 88

Journalisms:

THE Cumberland field in Marshall and Bryan Counties is the most important discovery in Oklahoma in recent years. Two prolific pays are almost completely developed, a third Simpson sand has proven productive and there are still deeper possibilities. Because of the steep structure well-spacing presented a considerable problem. Hard formations, combined with steep dips and high gas pressures in formations above the pay made drilling difficult. The field lies in part in the flood plain of the Washita River and would have been submerged by the lake impounded behind the Red River dam at Denison, Tex., had the river been left in its original channel. It is being diverted around the field. A staff article, scheduled to appear in next week's Engineering and Operating Section will show how the various operating problems have been successfully met.

REACTIONS between the soluble constituents of circulating water in a cooling system and added make-up water cause deposition of scale or may result in the formation of corrosive compounds. These may be eliminated by a proper stabilizing treatment which is generally simple, provided all factors entering into the system have been considered. In next week's Journal, W. H. Thompson and J. W. Ryznar, of National Aluminate Corp., will discuss these factors and the various types of pre-treatment which may be necessary.

OUTDOOR pumping units which have been introduced in many field gathering systems, present a problem in weatherproof housing. In next week's issue, C. W. Gladson, a welder in the employ of Stanolind Pipe Line Co., will describe the manufacture of a housing which has proved both economical and effective over many, many months.

CALENDAR

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10, Pittsburgh, Pa.

CONTROLLERS INSTITUTE OF AMERICA, twelfth annual meeting, Waldorf-Astoria, New York, September 20-22.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf-Astoria Hotel, New York City, September 21-22.

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting, Santa Fe, N. M., September 24-25.

October

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS, third annual meeting, Houston, Tex., October 5-6.

PETROLEUM INDUSTRY WAR COUNCIL, regular monthly meeting. Washington, D. C., October 6.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 14-15.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 25.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA annual meeting, Fort Worth, Tex., October 25-27.

November

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting. Palmer House, Chicago, Ill., November 8-11.

December

NINETEENTH EXPOSITION OF CHEMICAL INDUSTRIES, Madison Square Garden, New York, December 6-11.